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### 08 Online Banking

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## 50 Android And Chrome Media Systems

Thanks to Google's lightweight operating systems, you can now buy simple media machines that fit in the palm of your hand. There are loads of these devices on the market, but some better than others. To help you make a decision, we've been checking out six of them. Which one deserves a place in your living room

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# Is Your **Online** Banking Really Safe?

We put our money and our faith in online banking but can we rely on it?  
**David Crookes** takes a look

**R**ecently, I tried to log into my HSBC bank account via my iPhone, but the system would not grant me access. This was doubly frustrating given that I was looking to confirm some incoming payments had gone through so I could, in turn, dish out some cash to the tradesmen working on my house.

Resisting the temptation to ask if they would rather be paid in Tetley tea bags (of which we currently have plenty given the rate they go through), I nipped upstairs and tried to log in via a desktop browser instead. Again, no joy.

At this point, I did what everyone appears to do in a crisis these days and headed to Twitter. There I found the answer to my problem: HSBC had been targeted by online criminals in a denial of service attack, and I was merely one of 17 million personal and business customers affected. The workmen began to eye up the tea, scoffed some buns and said it would be okay to try again the following day. All, it seemed, was well with the world again.

And that would have been a relief had it not been the second time in a month that HSBC had been affected in such a way. Such occurrences do two things. They make you realise just how reliant we are on technology for our financial stability, and they also make you wonder just how safe our cash actually is. If a DoS can lead to a minor SOS in instances such as this, then what would happen if the criminals actually managed to breach a bank's security and took away our meagre earnings?

As it turned out, HSBC was full of glee. "HSBC UK internet banking was attacked this morning," it tweeted, "We successfully defended our systems." It conjured up images of a gang of bank robbers trying to bust their way through the door of a safe while an army of financiers pulled it shut from within. Yet, as we're seeing more and more, physical bank robberies are proving to be so last decade. Will it therefore only be a matter of time before a criminal group makes a major breakthrough?

## Shoring Up Defences

Currently, we can breathe a sigh of relief. "We haven't seen mass account compromises as a result of weaknesses in

the overall security of online banking," says Javvad Malick, security evangelist and community manager at security company AlienVault. But, even so, there are limits to how far online banking can go to protect our money. "Online banking, much like other aspects of banking, is as secure as it needs to be from a business and financial perspective," Malick continues. "Just like credit card fraud, mortgage fraud and so on exist, there is a cost to increasing security to the point of diminishing returns."

So as attacks continue to evolve and increase, what is secure – or sufficiently secure – today, may not be the case tomorrow.

“ Online banking, much like other aspects of banking is as secure as it needs to be ”

"Banks need to keep one eye on today's trends and one eye on future developments," Malick warns. And that begs questions about whether we're sitting ducks on the verge of something rather nasty. Experts are unanimous in agreeing that the denial of service attacks may only be the start of an action that can quickly escalate into something much bigger and far more dangerous to our economic stability.

As it stands today, DoS attacks are relatively harmless, simply flooding a system and making it unavailable, to the frustration of customers demanding greater reliability. It means the biggest issue is availability, but there are wider repercussions. "The DDoS attack against HSBC was at the end of January when many people are submitting their tax returns, as well as waiting for their pay," says Malick. "The impact to many individuals was greater than had it been towards the beginning of January. Also, as consumers and businesses become more reliant on online transactions, they don't necessarily have



## Limit Your Liability

According to Professor Anderson, customers who want to bank online need to do all they can to limit their own liability. But what steps should we be taking?

### 1. Don't fall victim to phishing

"The main risk to alert people to is phishing, and specifically of the more technical kind where you get malware that facilitates a man-in-the-browser attack," Anderson says. "The bad guy sits between you and the bank, and when you think you're authorising a payment of £50 to me, you're actually sending £5,000 to him."

### 2. Check the website you're on

Watch out for sites that are looking to get hold of your personal details, passwords and PINs. Check the URL of the banking site you're on. Does it look legit, and does it have https in the address? Type the URL directly rather than going through a search engine or clicking on a link from another source such as an email.

### 3. Look for your name

Is an email supposedly from your bank addressing you by your name, or is it starting 'Dear Customer'? If it's the latter, then you really ought to steer clear, because it's a sure sign that it hasn't come from your bank and, even if it has, then it's most likely going to be some generic junk that you can simply ignore.

### 4. Catch those spelling mistakes

Hey, we all make spelling mistakes, but if you spot some unusual arrangements of letters in your emails, then the alarm bells should be ringing – even more so if it's then accompanied by some odd requests. No online banking service is ever going to ask for your bank card's PIN and certainly not via email.

### 5. Don't bank using your PC

This may sound surprising, but Anderson says, "Don't use a Windows machine if you must bank online. Use something like an iPad, for which there is no malware currently available, at least to low-grade crooks (the NSA has some, but if they're part of your threat model, there are other things you have to do)."

### 6. Keep things to yourself

Careless talk costs money, so don't tell anyone your security details either verbally or by writing them down (and if you're on the phone, check who's listening). It goes without saying that if you really do need to make a note of them, that you should use some of code known only to you, and you don't place them in the same pile as the rest of your banking documents and devices.



### 7. Choose secure passwords

Don't choose a banking password that is the same as any other password you use, and make it as complex as you possibly can. Certainly don't choose anything that is obvious or personal, such as a favourite football team or your date or birth. And go for two-factor verification wherever it's offered, because it adds an extra layer of security.

### 8. Be aware of current con tricks

"Many people let themselves be fooled into deliberately making payments to people they shouldn't," Anderson continues. "If you owe a supplier some money and they email to say that their bank details have changed, check on the phone, or you may end up sending money to the wrong place. This is a rapidly growing scam, and many company finance departments are quite blind to it."

### 9. Leave the prince to his own devices

Don't give assistance to under siege princes desperate for a bank account, who promise to pay handsomely for your help. "And that's before we talk about the sad vulnerable people who send money to a 'young lady' who says she loves them and just needs plane fare, or to the widow of a Nigerian politician who says she'll share her stolen money if only the mark will pay an advance fee," says Anderson.

### 10. Log out of your account

Most banking services will automatically log you out after a certain time, but don't rely on that. If you nip away from your screen during an online banking session and there are others around, then there's a risk that someone could jump on and have a poke around. This is certainly true when logging in using a public computer.

sufficient backup processes in place to cope with a flood of online users such as call centres or branches."

What, though, if criminals seek to take things one step further? "We've seen many instances in recent months where DoS attacks are used as a distraction tactic," Mallick continues. "By launching a DoS attack, a company will try to remediate the impact of it – creating the perfect opportunity for an attacker to exfiltrate data or install malware."

Malware is one of the biggest problems facing the online banking sector. In November 2014, news began to emerge of a strain of malware known as Dridex, which was able to infiltrate computers and steal usernames and passwords. It was spread via an email containing a Microsoft Word or Excel document, which victims were tricked into opening on the pretence that it was an attached invoice from a bank, online retailer or software company.

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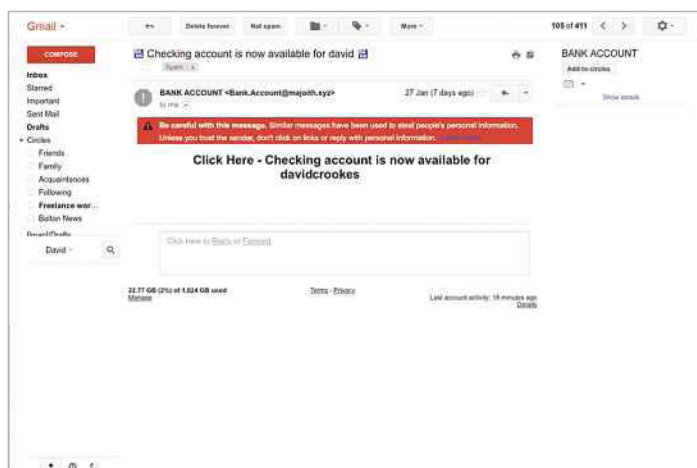
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Once the malware was installed on a computer, it enabled attackers to upload, download and execute files, monitor network traffic, take screenshots of the browser, add the computer to a botnet and communicate with other peer nodes. So far, it has been responsible for losses totalling some \$100 million, and it may have been behind online heists on UK banks worth more than £20 million.

## “ If the bad guys get into the systems of the bank itself, you’re protected by insurance ”

Dridex is still active and the National Crime Agency in the UK has been taking it very seriously. In October last year, it issued a fresh warning, urging people to update operating systems and anti-virus software. The Agency says it has been “conducting activity to ‘sinkhole’ the malware, stopping infected computers from communicating with the cyber criminals controlling them”.

“This is a particularly virulent form of malware, and we have been working with our international law enforcement partners, as well as key partners from industry, to mitigate the damage it causes,” says Mike Hulett, head of operations at the National Crime Agency’s National Cyber Crime Unit. “Our investigation is ongoing, and we expect further arrests to made.”

It has emerged that Dridex was developed by cyber criminals in Eastern Europe, but the problem is very much a worldwide

one. According to security company Kaspersky Labs, in the third quarter of 2015 there had been 5.68 million notifications about attempted malware infections to steal money from users via online access to bank accounts. Last February, the firm also said there had been an “unprecedented” cyber-attack on up to 100 banks. Criminals had accessed bank networks by sending spoof emails to staff.

It is at this point that alarm bells should be ringing. We’re often told what we need to do to protect ourselves from online thefts but, as we’ve also seen from past cyber attacks, human error far from our own hands can also be to blame. Add that to systems that are not quite as robust as they’re imagined to be, and it soon becomes clear that questions about the safety of our internet banking really do need to be asked.

## Extent Of The Problem

Last year, online banking fraud reached £130 million, up £70 million on the year before. And last October, figures collated by the RBS Group showed that 5,000 of its customers had fallen victim to various scams from January to September, with the amounts stolen amounting to some £25 million. The amount of money people are losing from scams is rising, and it now sits at £13,000 on average. Worse still, 70% of victims never see any of their money again.

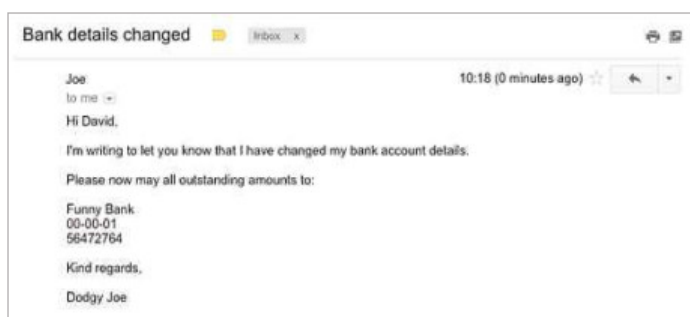
In some cases, we’re our own worst enemies. According to the RBS Group, the main reason for rising levels of fraud, certainly among customers of NatWest, is vishing. This is short for ‘verbal phishing’, and it describes when rogue callers trick victims into revealing their account details and passwords. But according to Ross Anderson, a professor in security engineering at the University of Cambridge, the banks also need to take on a greater proportion of the responsibility. If criminals become more sophisticated, customers cannot be expected to be the vulnerable front line soldiers.

Anderson has frequently gone on the record to say that he refuses to bank online, and one of his main problems is that banks have moved the liability for fraud from themselves to the customers. It means if someone manages to get into your account using your passwords, then the liability is entirely yours. It doesn’t matter if the details were taken from you without your knowledge or if you’ve carelessly written them down on Facebook: the outcome is the same. It’s your responsibility, and if you’re found to have allowed criminals access to your accounts through negligence or accident, then you can wave goodbye to your money in a lot of cases.

Former hacker Mustafa Al-Bassam said as much during the Wealth Management Association’s Financial Crime Conference in January. As part of the underground hacking group Luzsec in 2011, when he was just 16 years old, he saw the problems faced by the banks from the other side, and his message was simple: “We care more about convenience than security.” Tellingly, that ‘we’, he says, is not just us, the general public, but the banks too. Damningly, he says there is no incentive for them to update security.

Does that mean we’re wide open, though? No, not in the slightest. Banks do make strong attempts to protect their customers, and they go out of their way to advise people on the best approaches to banking online. Their terms and conditions stress over and over again the need to be careful and the dangers of customers being lax with their own security.

Some banks make customers leap through hurdles to get at their money, the aim of which is to make it harder for an



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unauthorised transaction to take place. It's broadly welcome, because if it's too easy for us, it's easy for criminals too. It is self-serving to a degree: the banks are aware we all make mistakes, and these kinds of measures save them a lot of hassle from customers complaining that their money has gone. Nevertheless, they're ultimately aiming to protect us.

For this reason, HSBC, for example, asks customers logging in from a desktop computer to input an ID banking number and parts of a password, neither of which should be written down. It asks for a personal piece of information such as a primary school. And it asks for a PIN (that only the real customer should know) to be entered into a special gadget (which only a real customer should possess), which then generates a one-off code that can be entered as the final login step (a case of two-step verification). This should be about as secure as putting up two or three thick lead walls between you and your cash.

## Security Concerns

But is every procedure welcome? Anderson, for example, has asked questions of some of the measures put in place by our banks, notably discussing credit card authorisation. In an academic paper written with colleague Stephen J Murdoch in 2010 entitled 'Verified by Visa and MasterCard SecureCode: or, How Not to Design Authentication', he claimed the 3-D Secure protocol used by the credit card companies used "lousy technology".

Also known by the brands Verified by Visa and Verified or MasterCard SecureCode, 3-D Secure will be familiar to many people who shop on the web. When you make an online transaction with a credit or debit card, you're taken to a screen that asks for parts of a password to be entered before the payment is authorised. This is a good move, because it means anyone who steals your card and tries to use it should hit a

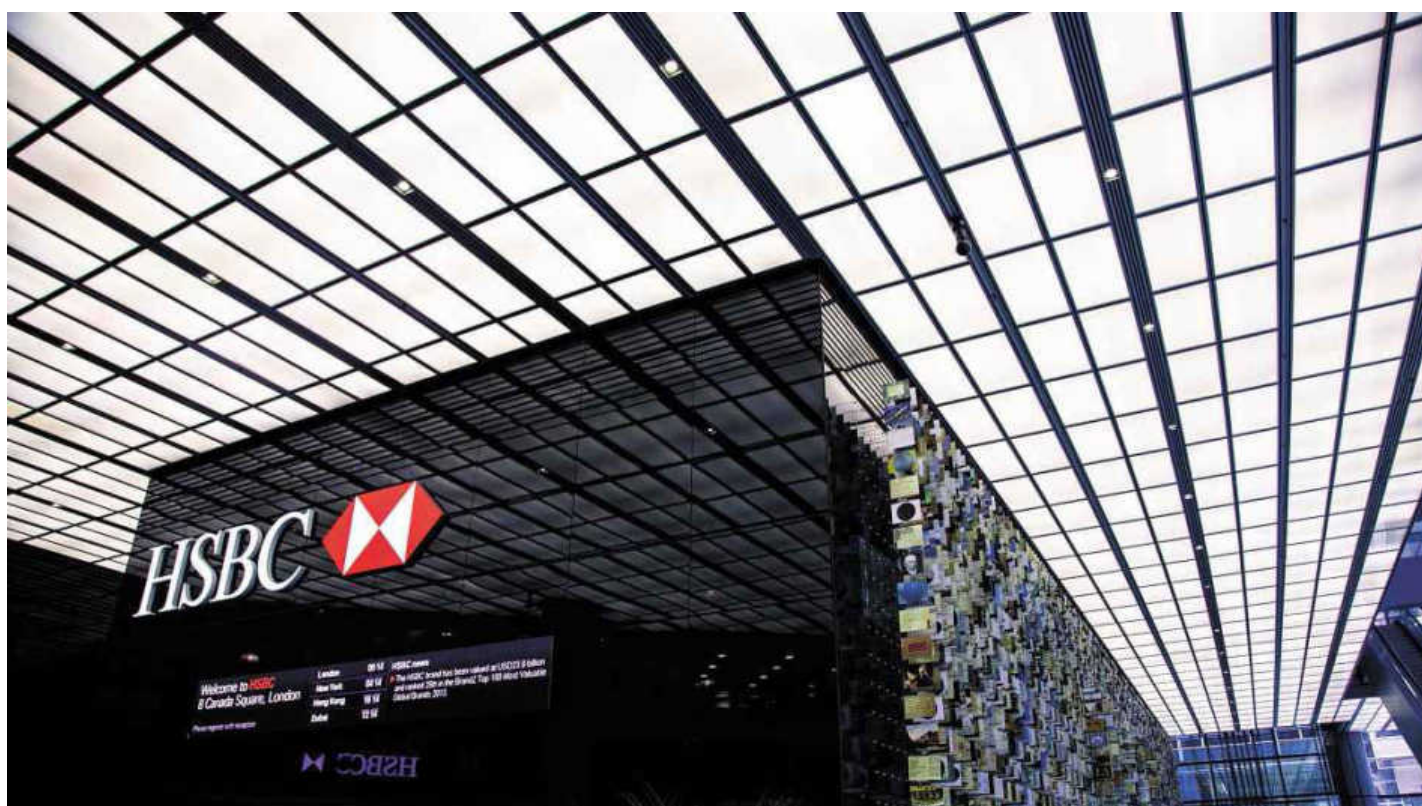
dead end (unless you've written your password down and taped it to the card, that is).

Yet one of Murdoch and Anderson's main beefs boils down to why and not how 3-D Secure is used. The paper says, "its use is encouraged by contractual terms on liability: merchants who adopt 3DS have reduced liability for disputed

“ Online banking fraud reached £130 million, up £70 million on the year before ”

transactions", which again comes back to that blame game. The idea here is that if someone has used your card and then verified it with your password, then the chances are that you've given the go-ahead, so you have to prove otherwise. This is difficult to do, so it puts the customer at risk of losing out.

Anderson is very much against the bank providers transferring their liability of fraudulent transactions to us when they're made using our passwords. He sees that as inherently unfair. Indeed, when asked if the reason why he's never banked online is because he feels the systems are unsafe or because the risk of any potential problems lie with the customer rather than the bank, he tells us, "The latter". It means the vulnerabilities we face when banking online have direct consequences for us, and it would seem your bank is not going to automatically bail you out if a criminal gets hold of your password and manages to take away your entire life savings.



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## Toe The Line

So what are we all to do? There's no getting away from the fact that online banking is, as Al-Bassam says, convenient. We can check our balances, pay our bills, set up standing orders and move money from one account to another. With fewer bank branches, inconvenient opening times and wages that are paid directly into accounts, online banking removes travel and hassle.

Assuming you don't want to follow Anderson and vow never to use to online banking, then you have to be savvy. Even though banks are potentially at risk of a mass breach at some point in the future, under those circumstances we customers should be protected. No bank is going to penalise customers for its own failings without the public kicking up a stink. For this reason, Jonathan Sander, VP of product strategy at the Lieberman Software Corporation, says, "the weakest links in the security of online banking tend to be the users". Then again, that's true of most technology.

"Users choose poor passwords because they can't recall them. Users decide to use the same username and password combination to secure their online bank account and their online cat food ordering account," Sander says. "When the bad guys break the poor security at the pet shop, they now have the keys to your bank account. But even with the poor choices of the users, they're still very well protected. Bad guys stealing money online will never really become the user's problem. Insurance will get them their cash back, and the bank is left with the higher premiums in the end."

Sander says the power to secure your online banking mostly rests with you, the online banking user. "Of course your bank may get attacked. If the bad guys get into the systems of the bank itself, you're protected by insurance and other mechanisms that mean you will have no real financial hit. Most often, though, online banking is exposed one poorly secured account at a time, as bad guys get username and password combinations from much weaker targets and then find someone used the same password at their bank too."

"The moral of the story is use every single security feature your bank gives to you. Turn on the bit that sends codes to your phone when you log in. As annoying as it may be, use a completely different username and password for the online banking account – at least a very different password. Don't make yourself an easy target. Understand that you are a target for sure – we all are. But also understand that with all those other easy targets out there, just a bit of precaution can make you too annoying for the bad guys to spend time on." **mm**

## What The Banks Say

We look at the terms and conditions of some leading UK banks.

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### Lloyds

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The Recreated ZX Spectrum operates using 2 x AA batteries (not included). Ideally, rechargeable batteries should be used as they can be recharged within the device itself, as it doubles up as a AA battery charger.

[illegible]

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# New Battery Technology

**David Briddock investigates if a battery technology breakthrough is imminent**

Consumer interest in portable computing technology shows no signs of diminishing. Every year we see a new range of slimmer, lighter and more capable laptops, 2-in-1 devices, tablets, smartphones and smartwatches to satisfy demand.

Yet manufacturers and consumers alike continue to be frustrated by short battery life and long recharge times.

## **Limitations And Frustrations**

The introduction of the rechargeable lithium-ion (Li-ion) battery was a portable technology milestone. Despite some undesirable limitations (see boxout), advances in Li-ion cell construction and power storage mean we've seen, on average, energy density increase by 5% per year and cost decrease by 8% per year.

Yet these gains have been offset by battery-draining, high-pixel-density screens plus power-hungry processing and graphics chips. Today we're just as far away from a mains-free battery utopia than we were a decade or two ago.

Our laptops rarely last a full working day. The latest smartphones are typically recharged daily. And who wants a smartwatch that needs to be charged every night? Even worse, it invariably takes many hours to fully recharge a battery pack – and up to an hour just to give it a quick boost.



▲ Prof. Rachid Yazami and his smart battery chip

It's only because we love our mobile gadgets so much that we're prepared to put up with these constraints. Even so, many owners feel a sense of foreboding, even panic, when they find themselves far away from a power socket with an almost drained smartphone battery.

## Key Breakthroughs

What we really want is a laptop battery that lasts all day and still has the power to watch a movie in the evening. A smartphone battery that lasts a minimum of two to three days, or ideally a full week. And surely in 2016 it's not too much to ask for a watch battery that lasts weeks on a single charge.

Well, in 2016 we seem to be on the threshold of innovations that could offer new hope for our communication devices, wearables, toys, electric vehicles, medical equipment and much more.

New anode/cathode materials and electrolytes promise a step change in both storage capacity and longevity. And nano technology, where engineering takes place at the atomic scale, keeps bringing new surprises.

We're also making progress on the multi-hour charging time problem. The latest ultra-fast battery charging solutions can provide a 50% battery boost in minutes, which negates the need for ever larger, heavier battery packs.

Let's take a look at some of the most promising technologies in more depth.

## Huawei Smart Chip

One big Li-ion battery limitation is excessive heat buildup during charging. As you might expect, faster charging times tend to exacerbate this problem, so manufacturers play safe. The result is our typical multi-hour recharge timescales.

However, the giant Huawei organisation has a solution. It's developed a tiny smart chip that can be easily embedded into all sizes of rechargeable batteries. These chips constantly monitor the health and status of the battery cells and report back to the charger.

Using this data, a higher recharge current can be applied until specified safety levels are reached. While this won't be long enough to fully recharge the cells, it's often enough to top it up to around 50–80%. This means we can top up our batteries in minutes instead of hours without the risk of overheating.

As Professor Rachid Yazami from the Nanyang Technological University in Singapore says, "In addition to knowing the degradation of batteries, our technology can also tell the exact state of charge of the battery, and thus optimise the charging so the battery can be maintained in its best condition while being charged faster."

Another benefit is battery longevity. As we all know, Li-ion batteries gradually lose their storage capacity over time, discharging increasingly quickly. And this is an important issue when modern gadgets frequently have non-replaceable battery packs. The Huawei smart chip helps the battery achieve a greater number of recharge/discharge cycles.

Imagine a world where all batteries have Huawei-like smart chips. Laptops, tablets and smartphones can make do with fewer battery cells, making them smaller and lighter. Smartwatches and other wearable gadgets suddenly make more sense. And those battery-powered cars, helicopters, drones and robots are much more fun when a charge boost takes just seconds.

Other areas would be revolutionised too, such as the portable medical equipment industry. And what about fast-charging electric cars? At a stroke long journeys would be possible on modest-sized battery packs, allowing designers to create a new breed of smaller, lighter and more ergonomic personal transportation.

## Oxis Li-S Battery

Li-ion limitations can be addressed through the use of alternative materials. Oxis Energy Limited ([oxisenergy.com](http://oxisenergy.com)) is working on one of these alternatives, a lithium-sulphur (li-s) battery, which it hopes will revolutionise the rechargeable battery market.

“ Who wants a smartwatch that needs to be charged every night? ”

The key factor in favour of Li-S is that it has, in theory, five times the energy density of Li-ion. In practice, this might work out at two or three times. Even so, a battery pack that lasts twice or three times longer – or one that is half or a third the size (and therefore weight too) – would still be a game changer.

Oxis report that its Li-S cells also achieve an excellent charge/discharge cycle lifespan, typically managing around 1,500 cycles before battery capacity falls to 80% of new. That equates to about four years of daily charging. And it thinks 2,500 cycles is possible within a few years.

Even better Li-S cells are able to discharge completely, whereas in practice Li-ion has a 80% discharge limit because they can be damaged by over-discharging. Also, Oxis cells have an indefinite shelf-life. In contrast, Li-ion batteries require a recharge every three to six months to prevent failure – something that often leads to warranty problems.

Safety is another important factor. Oxis cells meet international standards concerning shocks, crushing, thermal stability and short circuits. A ceramic lithium sulphide passivation layer and the non-

**oxis**ENERGY  
Next Generation Battery Technology

▲ Oxis Energy Limited



▲ *StoreDot FlashBattery demo*

flammable electrolyte cope with extreme situations, including bullet and nail penetration. Li-S is also a greener solution, because the sulphur replaces heavy metals such as nickel and cobalt.

## StoreDot

In 2014, at Microsoft's Think Next symposium in Tel Aviv, the Israeli-based StoreDot company ([store-dot.com](http://store-dot.com)) demonstrated a prototype fast-charge smartphone battery. The claim was that its new FlashBattery could be fully recharged in just 30 seconds.

“ **FlashBattery recharge speeds are 100 times faster than a typical 2000 mAh mobile device battery** ”

It sounds amazing, so what's the secret? It's all down to an innovative nano-technology: 'nanodots' formed from bio-organic peptides. Abundant in nature, these bio-organic peptides can also self-assemble, simplifying battery cell construction and lowering manufacturing costs.

Inside a cell, these peptide nanodots react with the lithium cathode to form a multi function electrode (MFE), essentially a super-sized capacitor. Capacitors are well known for their fast charging capabilities, but the problem is they discharge quickly too. But the StoreDot FlashBattery has a slow discharge rate, on a par with a lithium-ion battery.

Battery engineers typically try to optimise a specific function: faster charging, increased capacity or extended battery life. Amazingly, StoreDot's solution improves all three. FlashBattery recharge speeds are 100 times faster than a typical 2000mAh mobile device battery. And StoreDot say it's good for 2,000 charge/discharge cycles, which is many times more than a typical Li-ion battery.

Safety is improved too. The lithium and organic compounds are encased in a multi-layer protection structure that prevents overvoltage and heating during high-current charging. And these material leave a minimal environmental footprint, in contrast to other batteries that contain toxic, polluting heavy metals.

StoreDot believes its technology can be scaled up for fast-charging electric vehicles. Many others, including organisations like Samsung Ventures, share this optimism and have contributed tens of millions of dollars in research funding.

An electric vehicle battery would consist of 7,000 interconnected StoreDot cells. The target is to fully recharge it in just five minutes,

## Li-ion Limitations

Li-ion batteries have a limited number of charge/discharge cycles. Another frustration is that there's some variability between cell longevity depending on where they were manufactured. In practice, this limits the usable lifespan of a typical mobile phone battery to a few years.

Lifespan is also affected by temperature. Elevated temperatures hasten storage capacity loss, as does poor internal ventilation. And smartphone, tablet and laptop design problems can lead to heat buildups. Extended recharge times is one way to keep cell temperatures under control.

Prolonged storage periods, which cause the cells to over-discharge, also reduce battery life. Electrolytic efficiency degrades due to unwanted side reactions – something that can occasionally lead to internal short-circuits.

More alarmingly, excess heat and side reactions can lead to a fire or even an explosion. That's a nasty enough problem for smartphone or laptop owners, but it's a potentially fatal one for road vehicles and aircraft. Numerically speaking, the risk is very low, far less than one-in-a-million. Yet billions of Li-ion batteries are produced each year, plus electric vehicles or aircraft frequently use batteries with hundreds of individual cells.

So Li-ion batteries need to have built-in safety technology to protect against fires and explosions. These include shut-down separators for overheating, tear-away tabs and vents for internal pressure release and thermal interrupts for overcharging.



▲ *A typical Li-ion battery*

which isn't much longer than it takes to fill up a vehicle's fuel tank with petrol or diesel. Yet a single charge should be good for 300 miles (480 kilometres) for the typical family car.

Of course, before these electric vehicles become a commonplace sight, there has to be significant investment in a national network of rapid-charging stations, just as Tesla is doing in the US to boost its own electric vehicles sales.

## Lithium-air

On paper, the rechargeable lithium-air battery looks to be another promising technology for next-generation energy storage. The aim is to take in regular air to fuel the chemical reaction, although so far the process relies on pure oxygen. Nevertheless, it does make for a particularly lightweight battery.

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▲ Fire damaged battery from a Boeing 787

Perhaps the most promising lithium-air battery attribute is its energy density, which is very close to petrol in terms of energy-per-kg. For electric vehicles this kind of energy density means a single battery charge would be enough to go from London to Edinburgh.

In practice, there are a number of hurdles to overcome, with energy loss, lengthy charge times and low charge/discharge cycle counts being some of the biggest lithium-air shortcomings.

However, a recent scientific paper ([goo.gl/x6Cnsd](http://goo.gl/x6Cnsd)) from a group at the University of Cambridge highlighted a new cell design, which uses a spongy graphene oxide electrode and a novel chemical reaction using lithium iodide. Lab experiments using this setup are encouraging. Energy efficiency now peaks at around 93%, and the battery can be recharged thousands of times without any noticeable change to efficiency levels.

Unfortunately, at present, the long charge times issue has still to be addressed, as does the ability to run on regular air rather than pure oxygen.

## Aluminium-ion

A team at Stanford University, led by Professor Hongjie Dai, believe new cell materials are the best way to overcome lithium-ion battery limitations. The materials they've selected are aluminium for the anode and graphite for the cathode.

Right from the start, there are big benefits. Both materials are readily available, cheap to buy and easier to manage from an environmental perspective. And these materials eliminate the heat-induced fire hazard of a lithium-ion cell. In fact, Prof. Hongjie Dai said, "Our new battery won't catch fire, even if you drill through it."

But that's not all. The resulting battery is actually bendable, thanks to the ionic liquid electrolyte being enclosed inside a flexible polymer-coated pouch. This makes it perfect for wearable devices like smartwatches and curved smartphones.

It already sounds good, but the icing on the cake is its performance. Aluminium-ion batteries have ultra-fast charging capabilities, down to just a few minutes, and they last too. The Stanford battery withstood more than 7,500 charge/discharge cycles without any loss of capacity.

The only fly in the ointment is that these cells only generate around 2V of electricity. While this is on a par with a 1.5V AA or AAA battery cell, it's only around half the typical lithium-ion cell power output. However, Prof. Hongjie Dai thinks improving the cathode material should eventually increase the voltage and energy density.

## Coming Soon?

Of course, it's easy to be sceptical. We hear about innovations every day, but often years go by before anything changes. What can we realistically expect this year?

Huawei's tiny, battery-embedded smart chips are expected to appear in devices at some point in 2016. And if that's true, we can be sure other manufacturers won't be far behind. Microsoft, Apple and other big players would love to launch products with rapid charging capabilities. Apple makes its own batteries these days, so maybe we'll see Huawei-like smart-charging chips in one or more of the forthcoming Phone 7 models.

StoreDot originally hoped to have some of its technology out in the marketplace by the end of 2015. That didn't happen, but it still has high hopes that StoreDot-enhanced products will begin to appear in 2016.

Aluminium-ion battery technology is tantalisingly close but probably still a few years away. However, lithium-air batteries are a long way from becoming an everyday reality; even a 2020 introduction seems overly optimistic without a sudden and, as yet, unforeseen breakthrough.

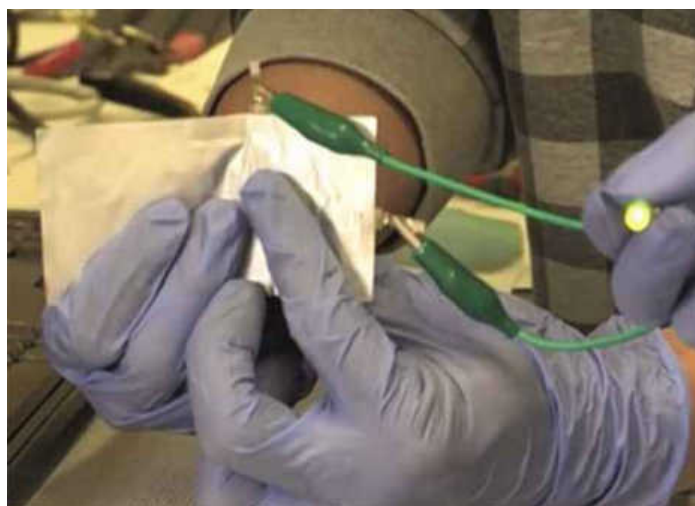
“ A li-sulphur cell has, in theory, five times the energy density of Li-ion ”

## The Race Is On

As the world becomes ever more reliant on advanced mobile technology, a new generation of rechargeable batteries is long overdue. An innovation leap would make everything from wearable electronics to electric cars a far more attractive and realistic proposition.

And there's plenty of money to be made. The market for advanced and post lithium-ion batteries is worth many billions of dollars, with some analysts suggesting a figure of around \$10 billion by 2020. Whoever puts a breakthrough battery technology into consumer's hands first can look forward to big profits.

Meanwhile, for all of us, a fast-charging, long-life, safe battery can't come soon enough. **mm**



▲ Bendable aluminium-ion cell

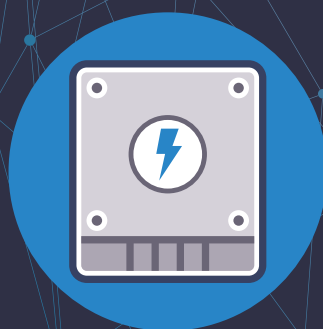


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# What Is

# AutoHotkey,

# And What

# Can It Do?

**Aaron Birch explains what this powerful tool offers and how to use it**

**F**rom image editors to video creation tools and programming suites, there are plenty of software packages that allow users to create things. The problem is, far too often, they're complicated and difficult to get to grips with.

Powerful image editors like Photoshop aren't the most welcoming of tools for those who have no experience, and even free options like Gimp have a

steep learning curve. These are merely tools for drawing and editing images, of course, so imagine how unapproachable a programming language is for someone with no prior knowledge.

Programming is something that comes naturally to a lucky few, but it takes others a long time to learn. And for some people, it seems completely unapproachable and beyond their reach. This is understandable, because programming is complex, and with so many languages to choose from, each with its own pros and cons, it's a real minefield.

What's needed is an introduction, some way to dip your toe into programming – a way that will let you reap the benefits of your efforts



**AutoHotkey**  
Automation. Hotkeys. Scripting.

quickly. In turn, this will build your confidence and give you the tools and understanding you need to take the next step. And if we don't have to hand over a lot of cash in exchange for this introduction, then that's good too. AutoHotkey is one such option. It's a perfect entry point for those thinking of giving programming a try.

## AutoWhatkey?

AutoHotkey is a totally free, open-source tool that can be used to automate various tasks. It started life as a simple macro creation tool, but quickly grew to encompass an entire programming language that can be used for a wide variety of tasks. Best of all, it's easy to use and is approachable for those with no prior programming experience. Those with programming knowledge should also find it useful, because it can be used to achieve results that other languages would require a lot more effort to reproduce.

Driven by a scripting language and initially focusing on keyboard shortcuts, hence the name, AutoHotkey can be found at [autohotkey.com](http://autohotkey.com). Once installed, you'll be able to create your own scripts. Unlike most programming languages, this doesn't make use of a complex GUI. Instead, it uses a simple text editor, probably Notepad if it's your default .txt editor. Into this you type the various commands and scripts AutoHotkey will use. To give you an idea of how simple this can be, let's look at a very basic, 'Hello World' script.

## Hello World

After you've downloaded and installed AutoHotkey, you'll be able to start creating. To begin, right-click your desktop and select 'AutoHotkey Script' from the New menu. Give it a name, ensuring the extension is .ahk. Next, right-click the new file and select Edit Script. A new Notepad window should open up (or another editor if you don't use Notepad as the default). You're now ready to write a script.

We'll create a simple command that outputs some text when you press a hotkey combination. To do this, type in the following:

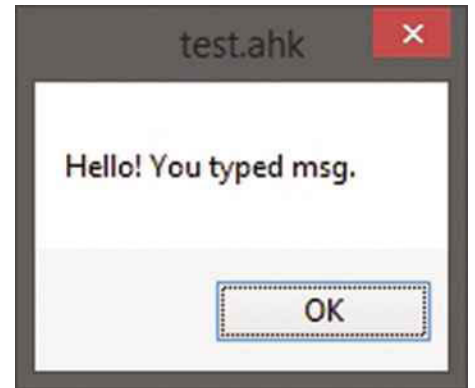
```
^H::
    Send, Hello World
Return
```

This simple script tells the computer to type out 'Hello World' when you press Ctrl+H. Let's break it down a little.

The character ^ represents Ctrl, so combined with H it's Ctrl+H. Simply, anything you type to the left of the two colons (::) sets the keys to press for the shortcut. Read on a bit further for a brief overview of AutoHotkey's key symbols.

The next line uses the command 'send' followed by a comma. Send, unsurprisingly, sends characters to the output. Anything after the comma will be typed by AutoHotkey – in this case the words 'Hello World'.

The final line consists of the command Return. This stops AutoHotkey from running any more code, stopping the script from running. This is essential, otherwise the script would carry on and, depending on the contents of it, you could run into all sorts of problems or even memory leaks.



▲ Scripts can prompt message boxes when certain criteria are met

To test this script, save it and close it. Now, double-click the AutoHotkey script. Once you do, it'll run, and you'll see the H icon of AutoHotkey appear on your taskbar. This signifies that a script is running.

Now, open up any text editor, web browser or anything else you can type into and press Ctrl+H. The words 'Hello World' will be typed instantly. And there you have it: your very first script. Easy, eh? To stop the script from running in the background, right-click the task menu icon and click Exit.

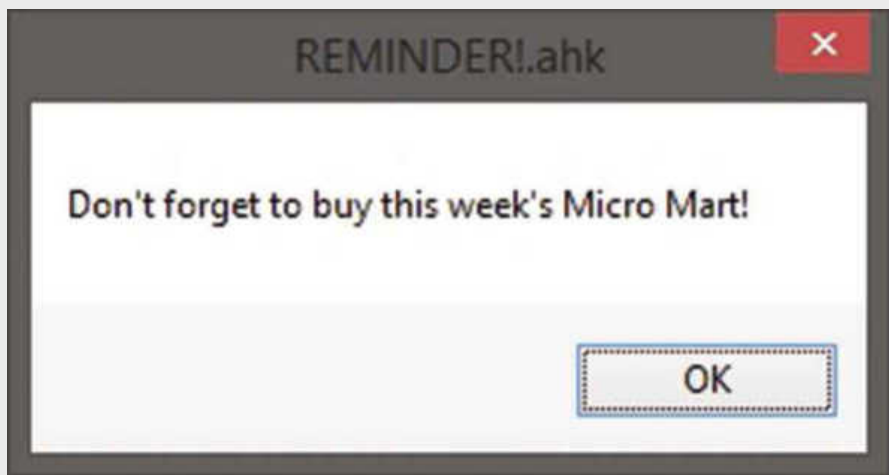
This little example perfectly demonstrates just how approachable AutoHotkey is for newcomers. It requires no specialised tools per se, just Notepad, and you can see the fruits of your efforts instantly, without having to compile code, assemble assets and use plug-ins or drivers. It's simple but powerful.

## What Can It Do?

AutoHotkey can do much more than this, though. The language it uses is surprisingly flexible. It uses concepts that can be found in many other languages,



▲ The famous first programming project via AutoHotkey



▲ Simple reminders can be created with a couple of lines of code

## Starting Blocks

A great use for AutoHotkey scripts is to run your code during system start-up or on a scheduled task. Using Windows' built-in features, you can browse to and run scripts, meaning you'll achieve a simple form of automation.

Let's say you have a script that pops up a message box to remind you to do something – a sticky note reminder, if you wish. You could do it with this simple code:

```
MsgBox Don't forget to buy  
this week's Micro Mart!  
Return
```

Now go to C:\Users\YOURUSER\AppData\Roaming\Microsoft\Windows\Start Menu\Programs\Startup and pop the AutoHotkey script in there. This will cause the script to be run automatically at start-up, prompting you with the message.

Of course, this can be done in many other ways, with special apps or even a simple notepad file in the start-up folder, but it's a simple example and one that can be taken much further with advanced programming skills.

such as arrays, objects, strings and variables, and it can be used to automate many tasks and for more advanced purposes. The more advanced you get and the more adept with the language you are, the more flexible AutoHotkey can be.

It would be impossible to cover all the details of the language here, but you can find more help at the website or within the local AutoHotkey help file. This can be found by simply running the program, which is actually the help file, because the language itself is integrated into your system and runs via the .ahk scripts. To access the program's manual, simply locate the AutoHotkey.chm file or search for AutoHotkey and run it. Here you'll find all the help you need, from basic to in-depth expert content.

Over time, you'll experiment with the language, and you'll discover all sorts of uses for it, above and beyond simple shortcuts. Macros, as we all know, can be useful and can save a lot of time. AutoHotkey is similar to macros you can make in the likes of MS Office, but it's

easier to use and learn than Microsoft's Visual Basic. It's also easier if you want to manipulate other programs and even Windows itself. It can even be used in business environments as a simple integration tool to bridge the gap between two programs and two different forms of data storage.

Advanced users of the tool can create whole interfaces, automate otherwise complex, time-consuming jobs and even make DLL calls and use COM objects. Some of this requires additional tools and plug-ins, but it all revolves around the core scripting language. As long as you take things slowly and focus on learning the basic scripting commands, you'll easily be able to expand and learn the more advanced features. Before you do, though, it's the basics that should be your main concern, so let's look at a few more examples.

## Hot Stuff

A hotkey is a command that's bound to a specific key combination, and it's

something you can create. AutoHotkey also uses another term called Hotstring. This is a way to use abbreviations to type out longer strings of text, among other things. For example, the following code will translate an abbreviation to its full text:

```
::tbc::To be continued
```

Unlike a hotkey, which is triggered by a key combination, this code is triggered by a specific text entry, which is the abbreviation. This can be used to not only translate text, but to trigger other commands, including complex scripts. For example, the following code will open up a message box with a specific line of text when it detects the string 'msg' has been typed:

```
::Msg::  
Msgbox Hello! You typed  
msg.  
Return
```

This is another example of a simple script that can have all sorts of uses. Just by typing in specific combinations of letters, you can trigger scripts to fire.

## Symbols

As you play around with AutoHotkey, you'll notice it uses specific symbols to represent certain keys within the code. This is similar to the approach a lot of programming languages take in order to simplify syntax and make it more flexible. Here are the basic symbols you should know about when starting out:

Symbol	Key
#	The Windows key
!	Alt
^	Control
+	Shift
&	An ampersand is used to combine two keys or buttons into a single Hotkey

There are other hotkey symbols used by AutoHotkey too, but these are for more advanced coding, so you're best off sticking to the above while you're learning. You can find out more about the additional symbols at [autohotkey.com/docs/Hotkeys.htm](http://autohotkey.com/docs/Hotkeys.htm).

A very important reference to have to hand is the list found at [autohotkey.com/docs/KeyList.htm](http://autohotkey.com/docs/KeyList.htm). This is a listing of the keys that can be entered to the left of the :: symbol. These key names represent the

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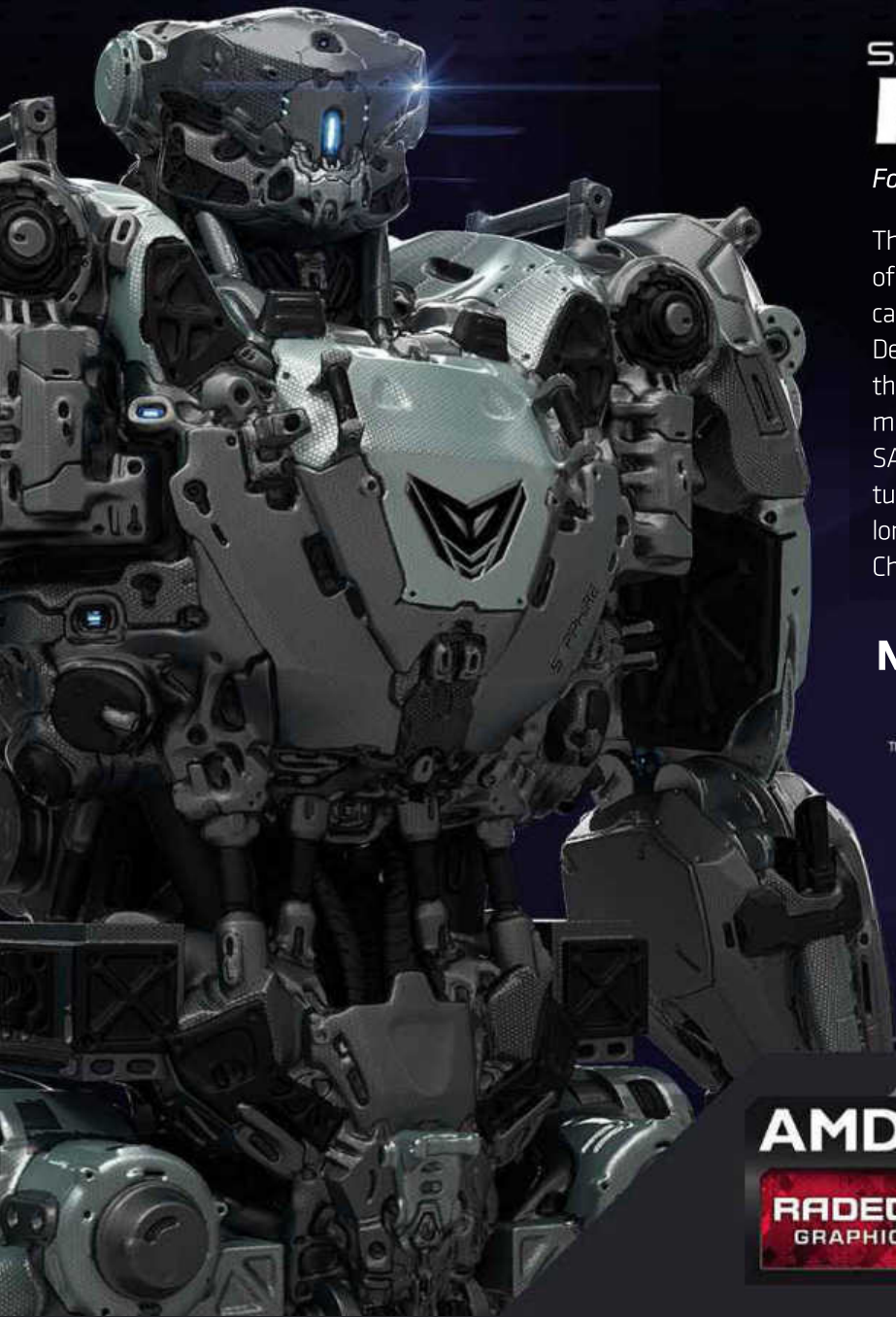
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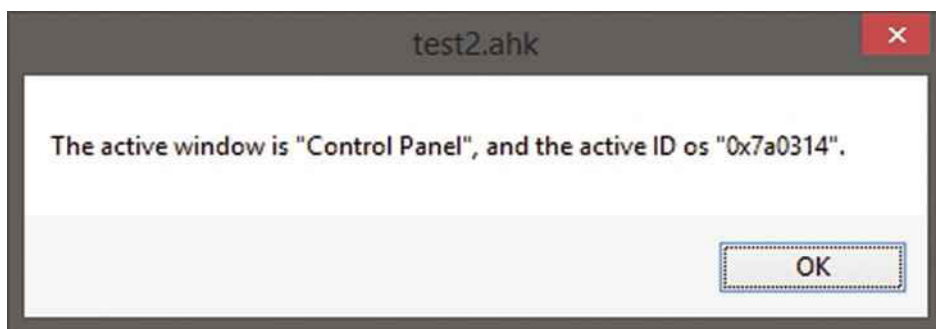
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▲ *AutoHotkey can return a lot of system information, with a basic example being the current Window title and ID*

actual keys you press to trigger the script. Here are a few examples:

Name	Key
LButton	Left mouse button
RButton	Right mouse button
MButton	Middle or wheel mouse button
CapsLock	Caps lock
Space	Space bar
Tab	Tab key
Enter or Return	Enter key
Escape or Esc	Esc key
Backspace or BS	Backspace
LControl or LCtrl	Left Control key. Corresponds to the <^ hotkey prefix.
RControl or RCtrl	Right Control key. Corresponds to the >^ hotkey prefix.

## Window Detection

A very useful feature of AutoHotkey is the ability to detect window states and titles. This means the tool can detect if a specific window is open and then act on it. For example, you may want the program to execute a specific action if someone opens a certain window. You could set up a script to show the message 'Don't mess with my settings!' if they open Control Panel, as a simple, somewhat silly, example. You could also use this as a check to execute code or not. For example, you could have code assigned to Ctrl+N that will only run if it detects Notepad is open.

The hotstrings (called directives) that can handle this are #IfWinActive, #IfWinExist and IfWinNotActive and #IfWinNotExist. The first queries if a specified window is open, while the second checks if a window exists. The 'NOT' variants check for the opposite, if windows aren't active or do not exist. There are more advanced commands,

and they can also be used with additional commands and Window IDs. Here's a small table of some examples.

Code	Behaviour
A	The Active Window
ahk_class	Window Class
ahk_id	Unique ID/HWND
ahk_pid	Process ID
ahk_exe	Process Name/Path
ahk_group	Window Group
(All empty)	Last Found Window

As a simple example, here's how to retrieve the name and active ID of any open Window by pressing a hotkey combination, in this case, Ctrl+H.

```
^H::
    WinGetTitle, Title, A
    WinGet, active_id, ID,
    A
    MsgBox, The active
    window is "%Title%" and the
    active ID os "%active_id%".
    Return
```

When pressing Ctrl+H, the code uses the WinGetTitle command to output

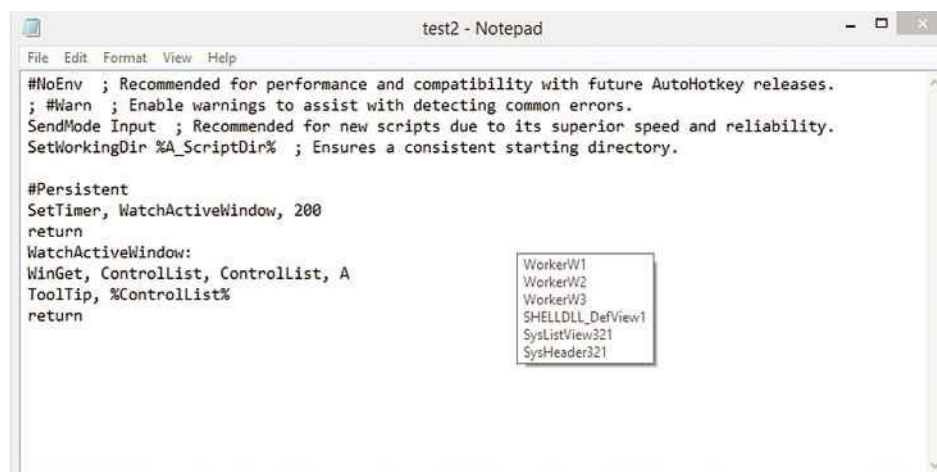
the title of the active Window and the WinGet command outputs the active ID. This information can be used for all sorts of tasks. Let's look at a more complex example, just to give you an idea.

```
#Persistent
    SetTimer,
    WatchActiveWindow, 200
return

WatchActiveWindow:
    WinGet, ControlList,
    ControlList, A
    ToolTip, %ControlList%
return
```

This code has a lot of commands you won't be familiar with, but with practice you'll understand it all. Basically, this is a persistent code, meaning it runs constantly. It uses a timer set to approximately 200 milliseconds to execute the 'WatchActiveWindow' function. When run, this watches for all active windows and outputs the ControlList name to an on-screen tooltip, which is updated in real time, every 200 milliseconds. Because it's persistent and updates in real time, it's a little slow and uses a lot of resources, but it's a great example of how flexible AutoHotkey can be if you use the code properly.

We've only been able to cover a brief introduction of AutoHotkey's language and abilities, but to really get to know it, you should download it and experiment for yourself. It's one of those flexible and really useful languages that can solve a lot of everyday computing problems, all without much effort. It's also highly recommended for those who want to venture into the world of programming or even those who already have some programming chops. Go on, give it a go. [mm](#)



▲ *Persistent code can run in real time and can perform complex functions*



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# Your Letters

## P2P Sharing On Windows 10

I have just re-read the article 'Hidden Windows 10 Secrets' in issue 1398, about the built-in P2P application in Windows 10, which is on by default. I am amazed that Microsoft is even contemplating this secret blatant theft of our bandwidth. It sounds like they will be sending updates, patches and Windows Store downloads and anything else they want using our computers to save their servers wear and tear. I have read the EULA and the rest of the gobbledygook that Microsoft want you to read before you agree to using Windows 10. I found only one place in it that may elude to this P2P sharing. Section 1 paragraph b subsection 1. This is so obscure that it may or not be about P2P sharing, but nowhere is P2P mentioned specifically in the EULA.

99% of people just click on the box I agree without thinking and without reading the EULA, which could be committing them to selling their children into slavery if the software companies wanted it. I and, I suppose, most of your readers are as guilty as the rest of the public in doing it automatically.

P2P was and is open to so many security problems. These to name but a few:

1. Trust. Who is it you are downloading from (Your local friendly crime boss)?
2. Enabling denial of service attacks, converting your computer into a zombie to aid the attacks.
3. Malicious software, your black hat hacker, Russian mafia, anyone with a grievance, the list goes on and on.
4. Decoy insertion. Sending you to a malicious computer or site to download anything they like. Kiddie porn, anyone?
5. Poisoning, just screwing up your download – quite a few twisted individuals out there.

Some or all of these have been tried or used by rights owners to stop people downloading pirated software and music and films.

Do Microsoft think that every person's computer is completely free of malware? You only need a poorly secured one to infect hundreds of others, then the cascade starts, millions of infected computers all helping to download to millions of others the next malware of choice to the unsuspecting public.

Some bright spark is rubbing his hands at the moment, thinking how shall I go about making sure my malicious software is downloaded. Recent events have shown no matter how secure you think your system is, a

kid sat in his bedroom is sure to get access to at least one Windows 10 computer even if it's not his own. How many companies running Windows 10 are going to trust their downloads to some computer run by a person who thinks security is locking his front door or who never bothers to change his passwords? Indeed, I've heard some computer wizard proclaim in the pub, "I check my computer every couple of months when I remember." Laughter all round.

Recent updates from Microsoft for Windows 10 have a habit of turning on parts of the systems you turned off, saying it's for your benefit as it will enhance your experience of their wonderful operating system. Should you be checking every few minutes that what you turned off remains off, or will Microsoft think your experience needs enhancing again?

I would like to know when did the CEO of Microsoft buy my computer? He never told me. It's a self build but still worth a grand in anyone's money. So Satya Narayana Nadella, cough up if you want to take over my machine. Euros, pounds or dollars will do. By the way, it's not a Windows 10 machine any more.

**David Shaw**

## More MicroSoft Threats?

I have just read your first article in the January Special (1398) entitled 'How To Get Windows 10' and almost choked to see "all Intel Skylake CPUs will require Windows 10..." I believe, after reading up a bit, this scaremongering from Microsoft requires some more explanation in your mag.

I am in my late 50s and have been with computing since the 80286-powered Vectra accompanied my Acorn Archimedes. I used the CLI in DOS aplenty and had a 2400-baud acoustic modem for reading bulletin boards.

I played with Mandrake and Suse throughout the late 80s and early 90s and then had kids! I ignored Vista, preferring to stay with XP, but worked on several choked Vista (and a few Windows 7) installations.

The moment of change came with the threats of non-support for XP over five years ago. I had an

Ubuntu 10 dual set-up, and decided to see if I could work with Linux. After my hard drive gave in on my laptop, it was installed there too! I now use Mint as my main OS and have managed to replace all the Windows applications I ever needed, most of which for free! I can even play most of those 90s and 00s Windows games I loved under emulation (thanks GOG), including some that wouldn't run with XP! (DOS4GW anyone?)

As an exclusive Linux user these days, I have no intention of ever returning to Windows, but when my current rig (Core 2 dual-core @3GHz OC) gives up the ghost, I would want the option to replace it with the latest, more power-efficient, hardware.

Mag's great BTW! Reading it since it was 80p.

**Dave**

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# Remembering... Delta Force

David Hayward dons his camo paint and army slacks this week

Long before *Battlefield 4*, *Call of Duty*, *CS:GO*, there was Novalogic's *Delta Force*. This quite extraordinary shooter saw you playing as one of America's finest combat troops. You entered enemy territory with a variety of weapons best suited for the mission at hand. Sometimes, you had to secure a 'package', but other times you simply had to wipe out the opposing force before making your way to an awaiting helicopter to escape.

It's was simple enough concept, but it worked magnificently in a time when open-world gameplay was beginning to emerge, thanks to a spate of more powerful processors and systems.

Its popularity stemmed from a number of import features Novalogic had the clever insight to introduce. For starters, it had a huge, open-world campaign (although the actual maps were limited to some degree and the action took place in certain sections). It featured loads of weaponry, tons of bad guys to send to meet their maker, stuff to blow up and, oddly enough, vultures that could sometimes be shot out of the sky.

Secondly, it also featured a stable and lag-free LAN client and server software, so up to eight players could spend an afternoon helping each other in the various missions or simply killing each other in the frantic deathmatch maps.

On top of the LAN multiplayer scene, Novalogic also hosted a number of servers featuring custom maps, clan wars and the usual mix of deathmatch, capture the flag, co-op, king of the hill and so on. The

NovaLogic servers were bombarded, almost constantly, but allowed for up to 20 players to battle it out day or night.

The Voxel graphics engine used was a blinding bit of genius on the part of Novalogic. Its use relied more heavily on the CPU rather than the GPU at the time, meaning you didn't need the latest Voodoo Banshee 3D graphics card to play, just a half decent processor – or, if you were lucky enough to gain access to a server, then you could enjoy some great gameplay on the two-processor Xeon machines.

Voxel also had some unique features that made it such an excellent graphics system to use. It had a near infinite draw distance, with very little memory required to deliver the results. It could also be used to great effect when drawing landscapes, rocks, trees and other scenery, which is why it worked so well with **Delta Force**. In addition, it was also an extremely easy system to customise and consequently write an editor for, which resulted in many excellent home-made maps.

## Its History

The voxel engine, Volumetric Pixels, was developed by Kyle Freeman, who helped launch Novalogic with John Garcia.

The first game to use Voxels was the 1992 release *Comanche Maximum Overkill*. Although a little rough around the edges at first, the processor-based graphics engine worked marvelously and was then used in the upcoming *Delta Force* games.

*Delta Force* was released in September 1998, followed by *DF2*, *DF: Land*

## Did You Know?

- Raised Sights was the worst cheat available. With it, you could go prone and target any other player on the map no matter where they were in relation to you.
- It even worked on a 200MHz Pentium Pro, which meant the PCs at work were used for something else other than Word.
- There was a scope over mode, where you'd see the game world through your character's left eye and the image through the scope in the right eye.
- *DF: Angel Falls* was never released and it's not likely to be.

*Warrior*, *DF: Task Force Dagger*, *DF: Urban Warfare* and the hugely popular *DF: Black Hawk Down*. After that, Novalogic launched *DF: Xtreme* and *Xtreme 2*, but the series was beginning to show its age, and sales faltered.

## The Good

Sniping a player from over a kilometre away with a .50 Barrett.

## The Bad

Cheats on the Novalogic servers.

## Conclusion

A great game and one we that remember fondly. **mm**



▲ Playing online or in a LAN, where old scores could be settled



▲ The scope over model worked well at times



▲ There were times when Scope Over was a little difficult to get used to

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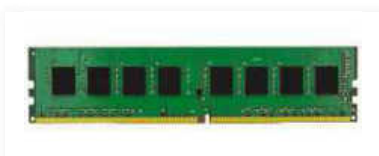
**Getting a new PC? Then it could be time to ride the DDR4 train...**

In a relatively short amount of time, DDR4 RAM has gone from being a premium extra to a genuine consideration for any new PC builder, especially with the news that AMD's future platforms will rely on it too. The increase in speed, bandwidth and efficiency it offers mean that the benefits can be impressive whether you're putting together a high-end system or a standard desktop. And if you want to make sure you get the best price for the latest hardware, then you need to check out these DDR4 deals.

**Deal 1: Kingston ValuRAM 4GB DDR4 [KVR21N15S8/4]**  
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**Deal 2: Corsair ValueSelect DDR4 4GB [CMV4GX4M1A2133C15]**

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Corsair's ValueSelect RAM is slightly better made than the ultra-budget ValuRAM, but broadly speaking you get the same specs: 2133MHz rated PC4-17000 with CL15 latency timings. It looks a little slicker than the basic ValuRAM, but it's still hard to recommend over the slightly cheaper Kingston stuff, given that the technical specifications are basically identical. We'll leave it up to you to decide!

**Where to get it:** Ebuyer – [bit.ly/1QI2woi](http://bit.ly/1QI2woi)



**Deal 3: Crucial Ballistix Sport 4GB DDR4 [BLS4G4D240FSA]**

**RRP: £25.29 / Deal Price: £20.49**

If you want something a little more elaborate – perhaps because you're building a gaming system – but still want to get

a good price, the Crucial Ballistix Sport might be what you're looking for. This 2400MHz, PC4-19200 RAM balances speed and price well, and it's also got a good-looking case to make handling it that little bit less risky. And while grey might not be a very sporty colour, at least it goes with pretty much everything!

**Where to get it:** Ebuyer – [bit.ly/1JivTLJ](http://bit.ly/1JivTLJ)



**Deal 4: Corsair Vengeance LPX Red 4GB DDR4 [CMK4GX4M1A2400C14R]**

**RRP: £29.99 / Deal Price: £22.93**

Gamers who are looking to overclock their system will want some slightly better RAM, and Vengeance LPX 2400MHz, PC4-19200 memory is both inexpensive and aimed at high-performance overclocking, with a pure aluminium heatspreader and eight-layer PCB to help keep it cool. Available in multiple colours, the Red is the least expensive (for reasons best known to free market economics, we imagine), so snap it up at a reduced price today.

**Where to get it:** Scan – [bit.ly/1E3JF4R](http://bit.ly/1E3JF4R)



**Deal 5: Kingston HyperX Fury Black 4GB DDR4 [HX426C15FB]**

**RRP: £38.40 / Deal Price: £24.04**

The fastest RAM we've looked at is the Kingston HyperX Fury Black, which is rated at 2666MHz, PC4-21300. It has full XMP support and low-latency modules, aimed at providing high performance at low costs.

Give the small price differences between RAM modules at this end of the market, we'd advise anyone who can afford it to start with these, whether you're an overclocking enthusiast or not!

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## Correction:

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# Council Computers Hacked

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# BAFTA Launches Young Game Designers Comp

### Entries for 10-18 year-olds

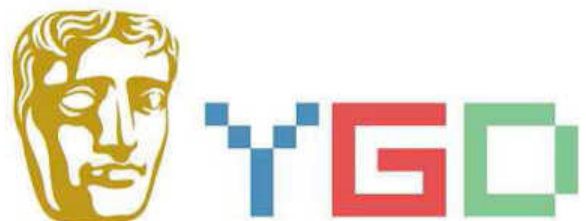
**T**he British Academy of Film and Television Arts (BAFTA) has announced the launch of this year's Young Game Designers competition, in association with Nominet Trust. The aim of the challenge being to inspire the UK's game designers and game-makers of the future to develop their ideas further.

Open for 10- to 18-year-olds, to register your or a family member's interest, head over at [www.bafta.org/ygd](http://www.bafta.org/ygd) and fill in the necessary details before entries close on June 3rd. Entrants can be individuals or a team of up to three people and they can choose to enter two creative categories. The full list of categories is on the BAFTA site, but the Game Making Award is a particularly good one as the winners will have their game further developed with the help of industry professionals.

A couple of awards also recognise adult contributions; for example, the Mentor Award seeks to reward an inspirational individual involved in the education of young game designers –

which could potentially mean a teacher, code club leader or other professional involved in encouraging kids and young adults on the art of video game development.

If you know anyone who would be interested in entering this, or if you qualify yourself, head to the website we mentioned before to register your interest.



Unfortunately, we need to highlight a problem with the CCL Iris 200 ([tinyurl.com/j52tx2s](http://tinyurl.com/j52tx2s)) that formed part of the Gaming PC Group Test we ran in issue 1399 (out 4th Feb). Specifically, the test machine had a problem with its SLI bridge, meaning it was only using one of the pair of ASUS Strix DirectCU II GTX970s installed in it. This means we quoted a lower benchmark score than it should have achieved. Our apologies.

### It's all fine now, though

Lincolnshire County Council became the talk of the web, when it transpired that cybercriminals had attacked its website, demanding a ransom to fix things again. The ransomware attack locked council workers out of their own systems after an email containing the dodgy malware was opened up. The financial demand was for \$500 to unlock the systems again, but the council's IT staff were not ones to take this kind of thing lying down.

No, they got their heads down and worked hard to resolve things, successfully managing to make sure that the systems were up and running again. Just as importantly, the council also confirmed that no personal data had been compromised in the attack.

As you would expect, the council has also said that it's going to be working hard to review its security systems in light of this attack. Most importantly, all involved should be pleased that it didn't give in to the attackers' demands for the ransom to unscramble its systems.

# Drones In Near Misses In UK

### It's not just America where this is a problem

So, drones... a bit of a pain in the backside, right? Such is the view of many in the aerospace industry, as the devices have been causing many a problem. With several reports of near-misses involving aircraft in the US, it seems that they're a big problem over here too.

According to data released from the UK Air Proximity Board, drones have been involved in four separate and serious near-misses at UK airports with one apparently coming far too close for comfort to a Boeing plane leaving Stansted airport.

Clearly, this isn't what anyone wants. So, while those involved with manufacturing drones will defend them, there are calls among MPs to put in place some

sort of improved regulations surrounding their use.

What with all the problems with drones and hoverboards, we'll stick with our trusty PC, ta.



A few years ago, I paid to remove the ads from the mobile game *Words With Friends*. I did this on an iPad, but I was pleased to find that it was stored on my account, so when I logged in on an Android phone, that was ad free too.

I haven't played this game for a long time, so I don't know if this is still the case, but do I know for sure that with most apps these days, it's not. Not only do you have to purchase apps for each of the operating systems you want them for, you also have to pay for in-app purchases again.

This, to me, is one of the biggest problems with the ecosystem model. Technology companies like Apple, Amazon and Google want to lock you in, by limiting their content to their devices and operating systems. That way, you'll be apprehensive about switching.

I've no doubt this works in a lot of cases. In fact, I've actually encountered people who won't change because they don't want to buy all their apps again.

Personally, though, it just puts me off spending any money at all. Not exactly the desired result...

*Anthony*

Editor

# Meanwhile... On The Internet...

**W**e talked a lot about the Podcast *Serial* last year, and how it became something of a phenomenon, and perhaps marked the most mature form of the podcast we'd yet seen.

There's little doubt of the impact that it has had on the media over the last year ([tinyurl.com/MMnet400a](http://tinyurl.com/MMnet400a)) with TV series like *Making A Murderer* now riffing on the shows template, and *The People vs. O.J. Simpson* dealing in the same did-he-didn't-he tension, and a series about the making of the show on its way.

In short, for the media, *Serial* changed a lot of things – from how podcast were perceived, to creating a whole new potential method for getting a complicated investigative report out into the public consciousness. However, for the subject of its now-legendary first series, Adnan Syed, it initially did very little to change his day-to-day circumstance. Though it is true to say that the murky, unclear, contradictory and far from cut-and-dry narrative of the events surrounding his case were, rather morbidly, part of *Serial's* addictive quality, it was also true to say that despite all the publicity, international attention and listeners, he was still in prison; still the convicted murderer of his ex-girlfriend, Hae Min Lee, and still guilty in the eyes of the law.

Now, though, things may be changing ([tinyurl.com/MMnet400b](http://tinyurl.com/MMnet400b)), as last week Syed found himself back in court, appealing for a retrial based on evidence discovered by, and in the wake of, *Serial*. However, not all of the evidence that was heard in the courtroom was the work of the team, led by former *Baltimore Sun* reporter, Sarah Koenig, behind the original podcast. Amid accusations she and the other movers behind *Serial* had lost interest in Syed's fate ([tinyurl.com/MMnet400c](http://tinyurl.com/MMnet400c)) as they looked to move on to series two (the very different tale of Bowe Bergdhal: [tinyurl.com/MMnet400d](http://tinyurl.com/MMnet400d)), the threads Koenig had picked loose in her investigation were picked up by his friend Rabia Chaudry in her own podcast *Undisclosed: The State Versus Adnan Syed* ([undisclosed-podcast.com](http://undisclosed-podcast.com)) and others, and it's some of the evidence they found that has underpinned the case Syed made for a retrial.

At the time of writing it's still not clear whether the amateur and professional sleuths that have been stung into action by *Serial* have succeeded in getting Syed the retrial he wants. Whether or not all their work will be helping an innocent man regain his freedom, or a murderer get off the hook is even less clear ([tinyurl.com/MMnet400e](http://tinyurl.com/MMnet400e)). If nothing else, it has proved that the sheer power of an online community – Reddit's role in creating a buzz around *Serial*, and keeping that buzz going cannot be underestimated – can make a real difference. We'll know more 'Next time on *Meanwhile...*'

**I**t's not often we come across a cybercrime story that we can honestly say we enjoyed reading. However, the tale of how a hacker appears to have repurposed the notorious password slurping Dridex malware ([tinyurl.com/MMnet1400f](http://tinyurl.com/MMnet1400f)), that's been used to remove a lot of money from UK bank accounts last year ([tinyurl.com/MMnet1400g](http://tinyurl.com/MMnet1400g)), is a bit of a doozy.

It would seem that some mischievous 'white hat' took it upon themselves to hack the network behind the malware, which uses malicious macros inside Word documents to trick computers into downloading a keylogger and other nasties onto the infected machine, so that instead of serving up its usual malifluous payload, it instead delivered and installed a copy of Avira antivirus ([tinyurl.com/MMnet1400h](http://tinyurl.com/MMnet1400h)). Nice.

Avira itself outright denies being responsible for the trickery, though a spokesman told *The Register* that the company's experts "have some theories" as to who is doing it, and why, but refused to be drawn on specifics. Instead, they noted that the act of interacting with a botnet in such a way was still illegal in many countries. Maybe they could just let us know, so we could buy them a drink and say no more about it, eh?

**W**hile we're on the subject of software that you don't want to install on your computer, we'll quickly mention the recent moves by Google to combat what it describes as 'Deceptive Download Buttons'. Y'know, the ads you see that tell you 'your computer is infected with a virus', or that you must 'install x to continue'.

Specifically, in a blog post ([tinyurl.com/MMnet1400i](http://tinyurl.com/MMnet1400i)), Lucas Ballard of the firm's Safe Browsing Team described them as links that either "Pretend to act, or look and feel, like a trusted entity – like your own device or browser, or the website itself" or "Try to trick you into doing something you'd only do for a trusted entity – like sharing a password or calling tech support."

In an effort to avoid either eventuality, Chrome will now highlight pages containing such content by displaying a bright red 'Deceptive Site Ahead' warning page should you try to visit a site using such adverts. So, if you are a viewer of unauthorised TV or movie streams, expect to see a lot more of that page in the near future... Not that that has anything to do with this move. Oh no.

**W**e have never, in 25 years-and-change, become fed up with quoting *The Simpsons*, which is why we foresee the Frinkiac ([www.frinkiac.com](http://www.frinkiac.com)) becoming an important part of our life online. The creation of Paul Kehrre, Sean Schulte and Allie Young, it is a database of three million searchable screengrabs, which can be married up to the oh-so-quotable script that accompanied them ([tinyurl.com/MMnet1400j](http://tinyurl.com/MMnet1400j)) and spit out a meme-friendly macro to order. Woo-hoo!

## .AVWhy?

Videos For Your Eyes...  
Not Necessarily For Your Brain

Well, this is one of the weirder things we've seen in a while: a remix of Alejandro Iñárritu's brooding, brutal western *The Revenant* that reimagines it as a cousin of classic console game *Tony Hawk's Pro Skater*. No really, Leonardo DiCaprio's *Pro Revenant* ([vimeo.com/153952949](http://vimeo.com/153952949)) created by Dominik Nero on behalf of the excellent *One Perfect Shot* web series ([vimeo.com/oneperfectshot](http://vimeo.com/oneperfectshot)), sees the film's hero racking up 'Native' combos and performing 'Horsey' tricks replete with classic sound effects. Uber strange, but kinda great too.



## Caption Competition



"Surely there must be a better way to get stereo music from a phone", thought Graham."

This phone obsessed individual was the subject of 1398's caption competition, and here's the best of your suggestions...

- **doctoryorkie:** "There is a word for this kind of behaviour... unprintable."
- **The VFM Addict:** "After taking many selfie snapshots Nigel decided to experiment with selfie phone calls."
- **JayCeeDee:** "I told you men can multitask - does this count?"
- **Ondrive:** "Harry Enfield's 'Loadsaphones' character never really caught on..."
- **JayCeeDee:** "Of course I love you... you're the only one!"
- **Ondrive:** "The concept of syncing multiple devices really confused Harry."
- **wyliecoyoteuk:** "'Tony realised that his new iPhone had no headphone socket, so desperate measures were called for.'"
- **PlaneMan:** "Rick Astley's brother didn't understand the concept of a conference call."
- **ricedg:** "This One Plus One will never catch on."
- **Thomas Turnbull:** "The wife has discovered an app that let's her nag me in stereo."
- **Thomas Turnbull:** "I was told on the internet that this would blow the wax out my ears."
- **Ian Grimes:** "Dave tried to stop it going in one ear and out the other."
- **Martin Courtney:** "Some people really love the sound of their own voice."

Thanks for all your entries, and congratulations to our winner, the aptly named **wyliecoyote**, who came up with "'Surely there must be a better way to get stereo music from a phone', thought Graham."

If you have something to say about the picture below (come on, you must have), head to the 'Other Stuff' section of our forum ([forum.micromart.co.uk](http://forum.micromart.co.uk)), or email us your funnies via [caption@micromart.co.uk](mailto:caption@micromart.co.uk), remembering to add the issue number to the email.

# Facebook Gets All Emotional

## Like? That's so last year

Facebook is making one of the biggest changes in its development to date as it is introducing Reactions alongside the Like button for its users to respond in a wide range of ways to posts.

Providing a more complex range of responses, the options are the existing "Like" then also "Love", "Haha", "Wow", "Sad" and "Angry" and they all come with a specific emoji. Facebook actually started testing some options last year and the ones it selected have been picked with the help of sociologists, according

to a *Bloomberg* report, with Facebook having looked at how people typically react to posts on the site. Clearly, there are many ways that we react to any given post, but the social network seems to think it's got most of our typical responses covered here.

If Facebook isn't really your thing then this probably isn't big news. To many of its typical users, however – particularly the younger ones – this should prove a welcome update to the site. It'll no doubt take a while for people to get used to the change, though.

# PC Gaming Rules, Okay?

## Revenues make for biggest segment

It's pleasing to hear that PC gaming is alive and well, with figures from SuperData's digital games market report confirming that it accounts for more revenue than any other segment.

The market report took samples of data from tens of millions of

gamers, publishers, developers and payment providers, concluding that it accounted for \$32 billion annually in comparison to mobile gaming's \$25 billion.

Unsurprisingly, free-to-play MMOs and subscription-based games such as *World of Warcraft* have driven sales in the sector.



## Snippets!

### Mobile Spend Grows

Smartphones have become the retail device of choice for the UK's shoppers, with 64% of all website visits to retailers last year coming from mobile devices according to market intelligence outfit SimilarWeb. We're also told that the UK carries out a bigger proportion of mobile shopping than our counterparts in the US, and only 35% of our retail therapy from a desktop.

### London VR Festival

Virtual Reality UK has made its debut this year with the two-day festival at London's Ravensbourne college showcasing the most innovative projects within the VR sector and including talks from the world's most leading virtual reality creators. The festival allowed all-comers to experience filmmaking and gaming projects incorporating virtual reality, including a VR experience of the recent movie, *The Martian*. Anything that celebrates technology here in the UK is good with us.

### New-Build Net Lag

New home owners in new-build properties are not too happy with their broadband service, according to an investigation from the broadband advice website **Cable.co.uk**. The site has written a blog post claiming that it has received many complaints from home owners on new-build estates about their sub-standard broadband, and its investigation also led to the Home Builders Federation saying that it's working with the government and Openreach to bring the "best possible service levels" for buyers. So, if you're a new-build owner with poor broadband, at least you're not alone.

# US Chap Settles Phone Filming Suit

## Wiretapping case comes to an end

A man in Massachusetts has been awarded over \$70,000 in a settlement over a civil rights lawsuit concerning his filming of a police officer using his iPhone. The case is a curious one concerning a George Thompson, who began filming a police officer outside his home after becoming offended at the language the officer was using in a telephone conversation. When said officer noticed this, he pushed Thompson to the ground and arrested him, causing him to spend a night behind bars.

For the swearing, the officer was handed a one-day suspension – but for Thompson the stakes were higher, as secretly recording the police is a serious offence as according to Massachusetts state law considered to be akin to wiretapping.

Charges against Thompson were dropped, though, as there was no subterfuge to his filming of event. Curiously, though, all evidence of what went on was deleted from his phone when it was mysteriously restored to its factory settings while in possession of the police. As for now, the civil rights case has been settled and Mr Thompson is considerably richer.

# Museum Comp Winners Pick up Prizes

## Female students inspired by Ada

The National Museum of Computing has revealed the winners of its Fascinating Ada competition, a challenge designed to inspire female students to take up careers in computing and technology.

The winners, aged between five and 18-years-old, all received their prizes from two of the first

operators of World War II code-breaking computer Colossus, handed to them at the Ada Lovelace Symposium held at Oxford University. Their winning entries have now also been published online.

Asked what they would like to communicate to Ada Lovelace about 21st-century technology, the winning entries included an

animated three-minute video explaining how computing has changed and enhanced our daily lives, plus a series of photos and captions demonstrating how much computing technology has pervaded everything we do.

A selection of the entries can be seen at the Museum's website – [www.tnmoc.org/ada/fascinating-ada-entries](http://www.tnmoc.org/ada/fascinating-ada-entries).

# Oracle Ditches Java

## Plug-in will be retired

Oracle has announced that it is putting its Java browser plug-in to rest saying that, as modern browsers are not really compatible with it any more, it's time to call it a day.

"By late 2015, many browser vendors have either removed or announced timelines for the removal of standards based plug-in support, eliminating the ability to embed Flash, Silverlight, Java and other plug-in based

technologies," Oracle said in statement announcing the decision on Wednesday.

The slow shutdown of Java will start on the next release of the Java Development Kit, JDK 9, but this isn't going to be a sudden stop. Ultimately, this is about Oracle steadily laying down Java over the foreseeable future with it being removed altogether in a future release somewhere down the line. All those security vulnerabilities, and the hostility they have drawn have finally taken its toll, it seems.

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# Computer Whiz Imprisoned

## Two-year period for serial spammer

Phillip Flietz has been sentenced to 27 months behind bars after he was found guilty of helping to send out millions of illegal spam messages to mobile phones all over the world.

Given that others involved in the case has received probationary periods for their part in the scam,

which took place between 2011 and 2013, Flietz may have thought he'd get a similar fate, but the judge ordered his sentence to start immediately.

Flietz operated computer servers in China to facilitate the spamming and while he was very apologetic during the sentencing it didn't stop him from doing jail time.

# Bill Gates Likes Queen

## Microsoft man proves he's not 'Under Pressure' in radio interview

BC Radio Four's *Desert Island Discs* has been privy to many fine guests in the past and now, Bill Gates has appeared on the show.

Do you think he's into Miley Cyrus, Daft Punk and S Club Seven? No. Predictably, Queen is on his Zune – and he particularly likes *Under Pressure* (which, apparently, reminds him of the disco days of his youth).

Other 'revelations' included that he's a big fan of *The Sound Of Music* and that his luxury item on his imaginary island would be DVDs of the world's great lectures.

As Bill himself joked: "Well, I suppose asking for an Internet connection is outside of the rules..." Ho, and indeed, Ho.



# Nothing's Up With WhatsApp, Apart From Its Users Numbers

## A billion users a month

Remember when Facebook paid \$19bn for mobile messaging service WhatsApp back in 2014? Well, it would appear that the expensive acquisition is paying off. Handsomely.

A billion people now use WhatsApp every month, according to figures from the official WhatsApp blog. That amounts to nearly one in seven people on Earth using the app to keep in touch with friends and family – and as the blog described the service as

"a simple idea: ensuring that anyone could stay in touch with family and friends anywhere on the planet, without costs or gimmicks standing in the way", it's fair to say that, sometimes, the simplest ideas are the best.

With 42 billion messages and 250 million videos sent over every day, it isn't finished yet. There are more users to entice and Facebook will be keen to get them on board. Impressive all the same, though.



## YoYoTech Warbird RS12 Gaming Desktop

A £1,500 high-performance PC, with a little extra added

### DETAILS

- Price: £1499.99
- Manufacturer: YoYoTech
- Website: [goo.gl/id30vh](http://goo.gl/id30vh)
- Requirements: Monitor, Windows account

**B**uilt into a monolith black tower, YoYoTech's Warbird RS12 begs you to take a closer look. And as you peer through the windowed side panel of the NZXT H440 case, you'll find plenty to like.

Forming the basis of this system is an MSI Z170A-G43 PLUS motherboard. Sitting in the CPU socket is an Intel i7-6700K Skylake processor running at 4.4GHz, and it's cooled by an NZXT Kraken X31 liquid cooler.

You also get 16GB of DDR4 YoYoTech branded memory, a 250GB Samsung EVO 850 SSD with Windows 10 Home 64-bit on it, and a Toshiba 2TB hard drive for mass storage.

The graphic on this particular monster come courtesy of an MSI GTX980ti OC Edition, an exceptional card with a base clock speed of 1102MHz. That's over 10% faster than the stock GPU speed. The boost clock speed is 1190MHz, which is over 11% faster than stock speed. The 6GB of GDDR5 isn't too shabby either, and it helps push the Warbird's 3DMark11 score to a pretty decent 18,909, while the PCMark8 score was an equally great 5,649.

▲ *The YoYoTech Warbird RS12 is an ominous and powerful gaming PC*



▲ *The choice of components is well thought out, and the system is exceptionally well designed*

The list of features doesn't stop there, though, as YoYoTech has also included a Creative SoundBlaster Audigy FX 5.1 PCIe sound card, as well as the Creative A250 2.1 speaker kit. There's even a Thermaltake Commander gaming keyboard and mouse kit, and a Creative SB Inferno gaming headset.

The PC itself is exceptionally well designed

and built. We've mentioned the layout of the newer NZXT cases in a recent gaming PC group test, and the H440 is no exception. The large radiator for the NZXT X31 Kraken is fitted to the front of the chassis, keeping it neatly out of the way from interfering with the other components. And the 620W Seasonic EVO PSU is tucked away at the bottom behind

the NZXT logo embossed power supply shroud.

This is a fantastic and high performing gaming machine, one that can easily run anything from the Steam library without breaking into a sweat. The selection of games we tested performed magnificently, never dropping below an unplayable frame-rate.

YoYoTech includes a three-year warranty with the Warbird RS12. The first 30 days are free collect-and-return; the first year covers full parts, labour and return to base; and the second and third years are labour and RTB only.

For the price, it's certainly one of the best gaming PCs we've reviewed – up there with the likes of the Chillblast, PC Specialist and Falcon Computers machines we've had in the past. In short, the Warbird RS12 is well worth considering for your next gaming PC upgrade.

**mm David Hayward**

**Excellent extras, design and performance**



# Rise Of The Tomb Raider

Can Lara's latest outing live up to her previous one?

## DETAILS

- Price: £35
- Manufacturer: Square Enix
- Website: [www.tombraider.com](http://www.tombraider.com)
- Requirements: i3-2100 or better, 6GB RAM, 26GB disk space, Nvidia GTX 650 / AMD HD 7770, Windows 7 or later (64-bit)

Three years ago, the Lara Croft was reintroduced to the world, in a grittier, more realistic form. 2013's *Tomb Raider* did away with the character's tiny waist and enormous chest, and gave us a more reasonably proportioned heroine. The developer, Crystal Dynamics, also came up with numerous imaginative – and often horrific – ways for her to die.

The game was an enormous critical and commercial hit, so a sequel was always on the cards. Wind forward a few years, and Lara is back, in *The Rise of the Tomb Raider*.

The title perhaps suggests this is a prequel, but it is, in fact, set a year after the events of the previous game. Lara is drawn into a hunt for the mythical city of Kitezh, the object of her late father's obsession. Here, it transpires, one may be able to find an artefact that is said to grant immortality: the Divine Source (as opposed to the 'divine sauce', which we're pretty sure is barbecue).

The mechanics of the game are largely the same as its predecessor. You run, you jump, you dive, you swim, and you use an array of weaponry, including an extremely versatile bow and arrow. Also returning are the



camp fires, which allow you to upgrade weapons, spend character upgrade points and fast travel to other areas.

There are some changes, of course, including more ways for you to use stealth, and increased focus on crafting and hunting. But the core of the game is the same, which is exactly what most people will want.

The platforming elements are fun, and the puzzles, when they crop up, are engaging but never frustrating. And you should never get lost, because you can simply use the Survival Instinct feature to highlight nearby items and places of interest. These include bonus

items, side missions, resources and enemies. You'll likely find yourself activating it almost constantly, which is a slight annoyance, because it only lasts a few seconds, and then there's a short cooldown period before you can use it again.

That's just about the only negative you can aim at *Rise of the Tomb Raider*, though. In just about every other aspect, it excels. The story, while not hugely original, is brought to life with top-notch voice acting and beautifully rendered cut-scenes. Indeed, the whole game looks amazing, if you have a graphics card that can handle it. And this

is no lazy console port. There are plenty of visual settings to tweak, so can get the best out of your PC, and the controls for gamepad or keyboard and mouse work well.

As with *Tomb Raider* (2013), though, be aware that *Rise of the Tomb Raider* carries an 18+ age rating. There's more than a little fruity language and a good deal of graphic violence. If you're after something more family friendly, then check out the also excellent *Lara Croft and the Temple of Osiris*.

**mm Anthony Enticknap**

**Another fantastic outing for Miss Croft**



# HP ProLiant Gen8 G1610T MicroServer

Mark likes what HP has done with its MicroServer line

## DETAILS

- Price: £179.99 Ebuyer (£124.99 after Cashback)
- Manufacturer: HP
- Website: [www.hp.com](http://www.hp.com)
- Requirements: VGA monitor, mouse, keyboard, SATA drives and operating system
- Part No. 819185-421

**B**ack in 2012, I covered the HP ProLiant N40L MicroServer in a build feature for Micro Mart. It cost less than £200 for the most basic model.

The HP ProLiant Gen8 G1610T is a modern equivalent and can be had for an astoundingly low £124.99 after cashback from HP.

I still use the N40L, and unpacking the G1610T revealed lots of similarities, but there are also significant enhancements that HP has made over the past three years.

Physically, this is marginally shorter than its predecessor but roughly the same in almost all other dimensions.

The common ground is four SATA bays (not hot-swappable) mounted in a cube chassis with the motherboard mounted in the base. This model has a space for

a slimline optical drive mounted in the top, but it isn't included as standard, and there are also no SATA hard drives included by default either.

What you get is a motherboard with a dual-core

Intel Celeron G1610T (2.30GHz 2MB 35W) pre-installed and 4GB of DDR3 RAM. To become fully operational you'll need drives (up to four can be installed) and the usual collection of peripherals, such as a mouse, keyboard and monitor.

What you also don't get is an OS, so those wanting Windows Server will have a much larger bill for that option, though you could put FreeNAS on it at no cost whatsoever.

One thing I noticed from the outset that's a vast improvement over the N40L is the organisation of the motherboard tray and general access to it. Previously,

the tray came out of the front, but it required you to almost entirely de-cable the board before it would move.

While some cables still need removing beforehand, it now slides out of the back, not the front. Best of all, it isn't really necessary to move it in order to add a card to the single low-profile PCIe x16 slot or upgrade the RAM.

The N40L was also exclusively USB 2.0, and this machine has a couple of USB 3.0 ports, though the total number of ports remains unchanged at seven.

HP no longer includes an eSATA port, but the



## Specifications

- Intel Celeron G1610T (2.3Hz/2-core/2MB/35W) processor.
- Intel C204 chipset.
- Dual Gigabit LAN sockets.
- iLO4 Ethernet connection.
- Four SATA drive bays.
- 7 USB ports (2x USB 3.0).
- 4GB of DDR3 upgradable to 16GB on two slots.
- 150W PSU.



motherboard does now have a micro-SD card slot, from which it's possible to boot an installation or recovery.

But the biggest connectivity changes are in the networking departments, because the ProLiant G1610T has two 1Gbit LAN ports that can be aggregated on an appropriate switch, and also iLO4 LAN socket. That last feature is something unique to HP server, and it provides an independent back channel for server management tools to control the machine. The iLO or Lights Out remote management controller is part of the standard hardware and could be a godsend to anyone with lots of hardware to manage remotely using just a browser.

In performance terms, the Celeron G1610T isn't a huge leap from the AMD Turin II

that HP used before, although for general file serving, there's sufficient power to service standard office clients.

The only downside to this choice is that at 35 watts, this MicroServer uses more than double the power of the 1.5GHz Turion II before it and even more than the 2.3GHz Turion II that HP used in the N54L.

For those who want more processor oomph, HP makes Pentium G2020T, Core i3-3240 and Xeon E3-1220Lv2 models. And as the Celeron is LGA 1155 socketed, these are upgrades you can do yourself.

As for obvious improvements in the next generation, HP needs to finally embrace hot-swap drive trays, and it needs a drive controller that can do 6Gbps on all four slots, not just two, for when people switch to using SSDs instead of hard drives.



It also features a conventional BIOS and not a UEFI for configuration changes. Yet my only really irritation is how noisy the internal fan can get if the system gets hot.

I put the fan excesses down to the passive CPU cooler HP used on the Celeron that needs some circulating air to do its job.

None of these aspects undermine HP's MicroServer concept as presented by the G1610T, because it's generally specified with this specific use in mind and not the job of being a general purpose PC.

Even with the Celeron CPU in the review model, this is a really serious piece of server kit which, given the addition of appropriate drives, can be deployed as a made-for-the-job file server in any small office.

After you've added some drives and an OS, this might

not seem quite as much of a bargain, but for technology that was designed for this file serving function, it's still remarkably cheap, even when compared with NAS boxes.

**mm Mark Pickavance**

***A small file server that's built precisely for that job***



# AVM FRITZ!WLAN Stick AC 860

Andrew Unsworth connects elderly laptops to 802.11ac networks with AVM's latest USB wi-fi adaptor

## DETAILS

- Price: £42.35 ([tinyurl.com/hbp4fuf](http://tinyurl.com/hbp4fuf))
- Manufacturer: AVM
- Website: [tinyurl.com/huedm2j](http://tinyurl.com/huedm2j)
- Requirements: 500MHz processor, free USB 2.0 port (USB 3.0 recommended), Windows Vista or later,

Although 802.11ac wi-fi routers have been around for some time, not all devices ship with 802.11ac adaptors. This is a shame, because 802.11ac connections provide higher data transfer speeds at greater distances than older wi-fi standards. This is good news for anyone who frequently streams movies and music from a NAS device, or those lucky enough to have high-speed fibre-optic broadband.

If your device doesn't have a built-in 802.11ac adaptor, you don't have to miss out: you can buy a USB 802.11ac wi-fi adaptor. AVM has for a long time released USB adaptors that are compatible with various wi-fi networks, but the FRITZ!WLAN Stick AC 860 is the company's fastest USB adaptor to date.

The Stick AC 860 slots straight into a desktop or laptop computer's USB port, but also



comes with a tough 93cm-long extension cable. Installation was a breeze. The Stick AC 860 comes with a helpful user manual that makes good use of graphics to explain the various ways in which it can connect to a wireless network, and the Stick AC 860 can auto-install its FRITZ!WLAN Client utility when it's inserted in a USB port.

We had no problem connecting to a network, but users must use the regular Windows wi-fi connection utility in the Taskbar, because the Stick AC860's utility doesn't have a scan and connect feature. While this is no hardship in the great scheme of things, it is a bit of shortcoming, as many other wi-fi

adaptors' utilities let users select and connect to networks from within the utility, and this is something we'd expect the FRITZ!WLAN Client utility to do too.

WPS connection is also available, and the FRITZ!WLAN Stick AC 860 supports AVM Stick & Surf, which is a neat feature that enables a secure connection to be made to a FRITZ!box without having to know the wi-fi security code. Users simply plug the Stick AC 860 into a laptop or PC and selects that FRITZ!box router from the network list, the computer will connect to that FRITZ!box automatically.

When connected to a FRITZ!box 7490 on the 5GHz band with an 802.11ac connection, the FRITZ!WLAN Stick AC 860 transferred data at an average 149.13Mbps at a distance of one metre and eight metres, and 41.05Mbps at 15 metres. In comparison, the D-Link DWA-182 wi-fi adaptor (£42.98, [www.dabs.com](http://www.dabs.com)) transferred data at an average 142.47Mbps at one metre, 139.81Mbps at eight metres and 13.74Mbps at 15 metres.

The DWA-182 and the FRITZ!WLAN are well-matched, as both are rated at over 860Mbps. The data transfer rates of the two adaptors at 15 metres may seem like quite a drop-off, but the 15 metre test is difficult, and there are many obstacles between the router and the test laptop, such as walls and metal objects. We'd expect to see better performance from both adaptors under less severe conditions, and with a clear line of sight between the test laptop and the router.

The AVM FRITZ!WLAN Stick AC 430, which is rated at 433Mbps, produced an average data transfer rate of 139.81 at one metre, 126.41 at eight metres and 17.55Mbps at 15 metres. As the Stick AC 860 is only a few pounds more expensive than the Fritz!WLAN Stick AC430, it's worth paying extra for the Stick AC 860 to benefit from the higher performance.

While it doesn't make sense to buy the FRITZ!WLAN Stick AC 860 to use it with a 2.4GHz connection, it's worth noting that its 2.4GHz-band performance is far from shabby. The Stick AC 860 transferred data at an average 83.89Mbps at eight metres, while the D-Link DWA-182 transferred data at an average 57.63Mbps. The FRITZ!WLAN Stick AC 430's 2.4GHz performance was lacking in comparison, with that adaptor transferring data at an average 21.4Mbps at the same distance.

The FRITZ!WLAN Stick AC 860 is compact, fast and user friendly. If you're looking to make the most of an 802.11ac router, the FRITZ!WLAN Stick 860 is a good choice, especially if you're already using an AVM FRITZ!box.

**mm Andrew Unsworth**

Distance	FRITZ!WLAN Stick AC 860	D-Link DWA-182	FRITZ!WLAN Stick AC 430
<b>2.4GHz</b>			
One metre	104.86	46.7	69.91
Eight metres	83.89	21.4	57.63
15 metres	7.78	Fail	9.22
<b>5GHz</b>			
One metre	149.13	139.81	142.47
Eight metres	149.13	126.41	139.81
15 metres	41.05	17.55	13.74

**Great performance and competitively priced**



# Edifier Studio M1360 2.1 Speakers

A new set of low priced powered speakers from Edifier

## DETAILS

- Price: £ 29.99
- Manufacturer: Edifier
- Website: [www.edifier.com/int/en/speakers/m1360-2.1-computer](http://www.edifier.com/int/en/speakers/m1360-2.1-computer)
- Requirements: A sound source via a 3.5mm stereo jack

Edifier produces quite a wide range of speakers. From simple (and inexpensive) USB-powered units, designed specifically for those on the move to top-of-the-range surround sound systems that rival anything in the market. Yet in my experience they all have one thing in common: a realistic price for a stylish quality product.

This latest product is no different, aimed squarely at the home or office computer user, the M1360 2.1 speakers are a fairly low priced set that perform surprisingly well. I say that, because when I did some online research I saw that one retailer was selling them for £137. So naturally I had to look again at the information supplied by the manufacturer, which confirmed a price of £29.99. I can only imagine the retailer must have got it wrong or is hoping that its customers are not going to check the current prices.

At £137, they would be overpriced but at £29.99 they're remarkably good value. They have decent range, and both bass and treble are clear and without distortion.

Another thing I like about Edifier is that it always limits its products to the levels they're capable of. I see so many companies overdriving their speakers just to get more volume out of them, but loud is not always good, particularly if it's distorted in the process.

The M1360 2.1 speakers consist of two relatively small satellite speakers measuring 64mm x 140mm x 112mm. They're angular units that connect to the back of the bass subwoofer by a 3.5mm plug,

and they lean back to project the sound upward and forward. The Bass unit is a substantial MDF unit nicely finished in matt grey or white, (in fact, I'd say it was black), and it stands on four small legs that lift it off the floor. The unit measures 158mm x 225mm x 252mm, and it has a round bass reflex port in the front to balance the air displacement, which also adds to the bass element. The bass speaker itself is a decent sized unit that faces downward. This produces a good bass level, particularly if it's set on a floor that resonates. It also houses the power switch and the cable for the remote control unit. This is a nice addition that's particularly useful in an office environment, where you might need to mute the sound to speak to someone, or perhaps to take a phone call. It also has a large rotary volume control and a 3.5mm socket to accept a set of headphones.

While the M1360 speakers don't pretend to be the ultimate in home entertainment, they produce good clear sound, with a



▲ The included remote control unit

respectable range that would certainly brighten up an office or possibly add a new level of immersion to the latest shoot-'em-ups.

**mm Joe Lavery**

**A surprisingly good set of speakers for the price.**

## Specifications

- Power output: RMS 2W x 2 + 4.5W x 1.
- Signal to noise ratio: ≥85dBA
- Satellite frequency response: 150Hz – 20KHz, SubWoofer frequency response: 20Hz – 170KHz .
- Gross weight: 3.20kg
- Net weight: 2.5kg



# LastPass 4

Roland Waddilove takes a new look at this updated password manager, which now addresses what happens after you die

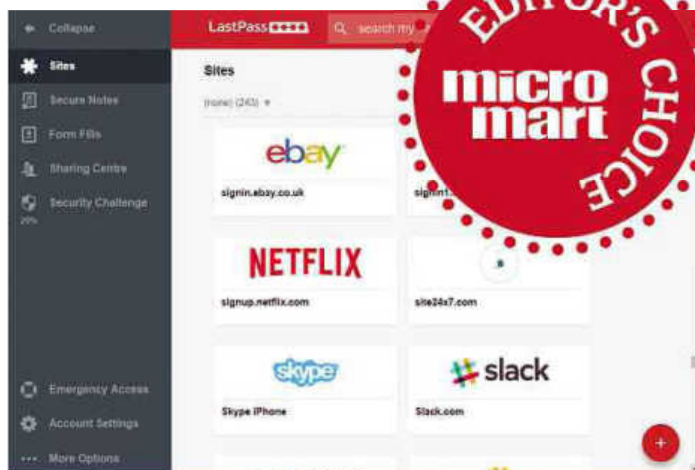
## DETAILS

- Price: \$12 a year
- Manufacturer: LastPass
- Website: [www.lastpass.com](http://www.lastpass.com)
- Requirements: Windows XP or later, 1GB RAM, 1GHz processor, 25MB disk space

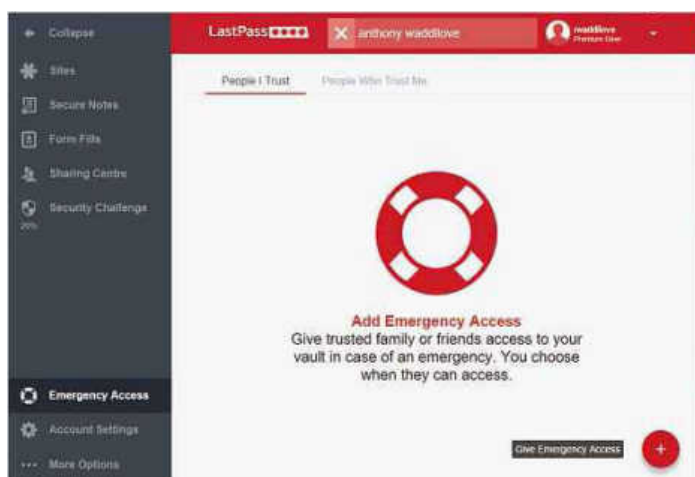
Passwords have been in the news recently, and the most popular ones have been published on the web. It takes seconds to find them using Google or Bing. How many of yours are on the list? If you use a password manager like LastPass, then there's no excuse for insecure passwords that are easily guessed by hackers or Googlers, and they can be as complex as you like. LastPass remembers them all for you and the password manager has been upgraded to version 4.

LastPass is available as extensions for Chrome, Firefox, Internet Explorer and Opera. Also, there apps for iOS and Android phones and tablets, and even support for Mac OS X and Linux. Almost all interaction with LastPass is through the browser extension. It detects forms, sign-up and login pages, and when you fill them in, it asks if you want to save them. It encrypts them, stores them and syncs them with other computers and devices you use, so your passwords are available everywhere.

On subsequent visits to websites, LastPass automatically fills in the login details. It doesn't work with every site, but it works with most. It copes with multiple logins for sites too – for example, if you have different



▲ The new tiled view of the websites you use offers an easy way to find and access them



▲ Add trusted people to your account in case the worse happens using Emergency Access

accounts. You can select the user name from a drop-down list, and it inserts it with the password. LastPass detects when a password is required and offers to create one, consisting of complex combinations of numbers, letters and symbols.

LastPass can be used for free on your desktop computer, but if you want to have access to your passwords on mobile devices, then an annual subscription is required. It's only \$1 a month (£0.70), which is so small an

amount you don't notice it. Mobile access is essential, because if you use complex passwords for everything, and you should, you'll be locked out of websites and services on your phone and tablet. With the LastPass app, you can access your account and copy user names, passwords and other information.

The main change to LastPass 4 is the redesigned website. The list view of sites with login details is still there, although it's

a bit smarter. There's a new tiled view, and site logos are displayed, which makes it easy to find sites. One click opens a browser tab, goes to the site and logs in.

Shared folders can be created and sites added to them. You invite people to access it and choose whether they can see passwords or make changes. The idea is that instead of emailing someone a password, which is insecure, you share it on LastPass.

The most interesting new feature is Emergency Access. In the event of an accident or death, your partner or family might need to access bank accounts to pay bills and sort out your affairs. You add people you trust to LastPass and choose a time delay of up to 30 days. If you're not actually dead when they try to access your account, you can revoke access rights. This is a useful way of addressing what happens should the worst happen.

I cannot think of a password manager that offers so much for so little money.

**mm Roland Waddilove**

**A great password manager, and well worth the price**



# SteelSeries Rival 100

SteelSeries extends its mouse range with an affordable version of the Rival

## DETAILS

- Price: £35.99 (Overclockers)
- Manufacturer: SteelSeries
- Website: [steelseries.com](http://steelseries.com)
- Requirements: Windows XP or later / Mac OS X, spare USB port

When SteelSeries first introduced the Rival, I praised it as "an excellent product that exhibits the sort of polish that SteelSeries is so good at delivering".

But that was over two years ago, so how has it developed its very popular gaming mouse now? In subtle ways that you probably weren't expecting.

Unboxing this mouse for the first time, I was struck by how little the overall shape had changed, because it's mostly surface detail that is different.

I noticed that the two thumb buttons on the left are now thinner and longer, and the side panels are also longer and no longer rubberised. SteelSeries also did away with the 'RIVAL' panel at the rear, which always looked like a misplaced number plate.

In terms of optical specification, it's actually retreated somewhat from the 6500dpi of the original design, with the Rival 100 now offering six levels of sensitivity up to a maximum of 4000dpi.

This level of movement awareness is achieved using a PixART 3059-SS optical sensor, built for a precise 1:1 ratio tracking. That means there's absolutely no hardware acceleration built into the mouse – great news for gamers.



“ It does the pointer control part of being a gaming mouse very nicely ”

With acceleration disabled, quick movements move the pointer quickly in a direct proportion to the scale of the action, instead of any sort of linear or logarithmic acceleration.

That's a good thing, because many people find it difficult to calibrate their movements accurately once acceleration kicks in.

Technically, this sensor can actually track movements where the hand undergoes a massive 20-Gs of acceleration and covers

3.63 metres per second. Not that people can usually move that fast, except in comic books.

It does the pointer control part of being a gaming mouse very nicely indeed, but since this is SteelSeries, it also comes with some digital bling. In this instance, that includes fully reprogrammable buttons (all six) and an RGB specifiable LED internal lighting.

These things are part and parcel of the PC gaming scene, but you don't have to make it

look like an accessory in TRON if you don't want to.

Having experienced the Rival 100 for a few days, I have only two valid criticisms of it to mention.

The first is precisely the same I gave the original Rival; that it is exclusively designed for a right-handed user. I'm right handed but I appreciate that there are others who are not, and they probably won't appreciate this mouse.

The other issue, and it's a minor thing, is that at just 127g, this is a very lightweight design, possibly too feather-like for some gamers.

That said, I generally like a heavy mouse but got on very well with this one, and it has one last trump card to play; the price.

The Rival first appeared with a price of more than £50, but this one is a good £15 less, with an RRP of €39.99.

While it doesn't deliver the extreme sensitivity of its predecessor, it's more than subtle enough for the majority of gamers and at a price most can afford.

**mm Mark Pickavance**

**A great gaming mouse that isn't expensive**



# GROUP TEST

## Android And Chrome Media Systems

The world of operating systems has been transformed in recent times. No longer does Windows rule the roost, and when it comes to media systems, users can now add Android and Chrome (among others) to their list of choices.

But what do these new streamlined boxes have to offer? To give you an idea, David Hayward has been checking out a selection of them, to see if they can really compete with Windows and Linux media PCs.

## Android And Chrome Media Systems

### Mad Catz Mojo

#### DETAILS

- Price: £95
- Manufacturer: Mad Catz
- Website: [goo.gl/PX143q](http://goo.gl/PX143q)
- Requirements: Google account, keyboard/mouse for alternative control

**T**he Mad Catz Mojo was one of the more exciting Android-based launches from last year. The quad-core 1.8GHz Nvidia Tegra 4 processor is one of the most powerful we've ever seen in an Android device and, when coupled with 2GB of memory, the Nvidia GPU does a wonderful job of delivering up to 4K resolution. Furthermore, there's 16GB of built-in flash storage that's augmented by a micro-SD card slot. As well as the HDMI output, there are two USB ports located on the rear of the unit, one of which is USB 3.0. Finally, a 3.5mm headphone port sits alongside an Ethernet port, but there's also 802.11a/b/g/n wi-fi and Bluetooth 4.0 support.

The Mojo is a wedge-shaped shiny black plastic

box, with the Mad Catz logo on the angled top and a power LED located on the front. Along the sides are a set of air vents, with all the relevant ports and so on located on the rear. It's functional enough, and there's plenty of room for larger USB sticks to fit without getting in the way of the other connections.

Included with the Mojo is the Mad Catz CTRL, a wireless Gamepad. The CTRL doesn't stray too much from the design norms of modern game controllers, but it does add one or two extras to the mix. For example, along the top of the controller's face you'll find a media player strip, with buttons for play, pause, forward, back, and volume. There's also a switch on the base, which can change the controller to three different modes. The first is a Smart mode, which will allow the controller to be recognised and work with any of the Mad Catz range. The second mode emulates an on-screen mouse, using the analogue sticks and face buttons (X, Y, A and B). The third is a PC mode, which allows the controller to work in a more



traditional way, as opposed to being an emulated mouse.

The controller also comes with a special bracket that clamps onto it and offers you a mobile gaming platform for use with your phone.

You get Android 4.2.2 (Jelly Bean) by default, with a Mad Catz GUI wallpaper and app links on the desktop. Unfortunately, there's no custom GUI, so navigation via the controller can be a little awkward. A keyboard and mouse are, therefore, recommended.

The Mojo is designed to be rooted, so any number of custom builds can be installed with relative ease. As for being a media centre, the Mojo does an excellent job out of the box, with superb quality and more than enough performance.



▲ The Mad Catz Mojo and CTRL look great



# Minix Neo X8-H Plus Android

## DETAILS

- Price: £95
- Manufacturer: Minix
- Website: [goo.gl/XwJQBn](http://goo.gl/XwJQBn)
- Requirements: Google account, keyboard and mouse for alternative control

**M**inix has a good range of small media centre products to its name, the Z64 Windows media PC being one of the better units we've tested in recent years. However, it's Android we're interested in this time, and for that we have the X8-H Plus.

The Minix Neo X8-H Plus keeps to the ultra-small format of the Minix Neo range. Measuring just 256 x 256 x 25mm, it somehow manages to pack in a quad-core A9r4 Cortex processor with an octo-core Mali 450 GPU, 2GB of DDR3 memory and a 16GB eMMC flash storage. The Android version is 4.4.2



▲ There's plenty to like about it, and the specs are good too

“ The entire unit feels sturdy and extremely well put together ”

(KitKat), but you can upgrade to Android 5.0.

Connectivity consists of a 1.4b HDMI port, gigabit Ethernet, three USB 2.0 ports,

an OTG port, SD card reader, S/PDIF, dual-band 802.11a/c wi-fi, Bluetooth, a headphone port and a mic port. There's even an infra-red sensor, with an Android remote control included in the package.

The design doesn't differ too much across the Neo range. The hardware ports, power and power button are spread along the rear of the unit and down the right-hand side. The left-hand side houses the screw connection for the wi-fi antenna. The entire unit feels sturdy and extremely well put together.

Once you've booted the unit and set up your Android/Google details, you'll appreciate the fact that this is unlike most other living-room Android units. They occasionally stutter along or feel awkward, but the Neo X8-H Plus is fluid,

quick to respond and is breeze to navigate with the included remote.

That's not all, though. This is primarily an Android TV box, and with it come the kind of capabilities you would normally expect to find with an expensive PC with a top-of-the-range graphics card.

The dual-band AC wi-fi offers fast networking, so streaming high definition and even ultra-definition content isn't a problem. Speaking of ultra-high definition, the X8-H Plus is capable of playing H.265/HEVC video at 2K and even 4K. This is thanks to the combination of a quad-core A9r4 and eight-core Mali 450, which supports the new higher-compression H.265 media standard.

The default Minix Android desktop hosts a collection of pre-installed apps. Among them are XBMC, YouTube, Netflix and Plex. Also, it supports the Google TV Remote app, which will use your current Android phone or tablet as a TV remote.

While it may not seem quite as powerful as the Mad Catz Mojo, the Neo X8-H performs slightly better. Load times are better, apps run more smoothly and the video at higher resolutions is less choppy.

A great Android system for less than £100.



▲ The Minix Neo X8-H Plus is a great media centre



## Android And Chrome Media Systems

### RikoMagic MK802IIIS

#### DETAILS

- Price: £30
- Manufacturer: RikoMagic
- Website: [goo.gl/ceJM1I](http://goo.gl/ceJM1I)
- Requirements: Google account, keyboard and mouse for better control or a remote

▼ The MK802IIIS could do with a serious update



The Rikomagic MK802IIIS is the third-generation device from the RikoMagic stables of products. These are a brand of mini Android-on-a-stick devices that plug directly into an HDMI port and offer Android connectivity straight to your TV.

This particular model features a 1.6GHz Rockchip RK3066 ARM Cortex-A9 dual-core CPU, Mali 400 GPU and 1GB of main memory. There are two models available, one with 4GB of storage and the other with 8GB, plus there's an SD slot with support for up to 32GB cards.

In addition to the SD slot, you get a full-sized USB port and a pair of micro USB

“ After just 15 minutes of use, the casing was much hotter than we'd like ”

ports. You also get N-class wi-fi, Bluetooth 4.0 and Android 4.1.

You'll need to power it via one of the micro-USB ports (a cable is supplied in the box), and a handy HDMI extension cable is included with the device. Then it's simply a matter of connecting a standard wireless mouse to one of the

USB ports and navigating the Android desktop.

Once you have a wi-fi connection, all you need to do is locate the media apps you want in the Play store and install them as you would normally do.

The apps that we ran as part of the test responded as we would expect from a small, fairly low-powered device. HD content was streamed from a NAS reasonably well, but it did stutter at times. Other apps, such as the BBC iPlayer, struggled to load anything at all.

One thing we did find particularly worrying about the MK802IIIS was the temperature of the device. Although we don't know the exact temperature, after just 15 minutes of use, the casing was much hotter than we'd like.

Although the concept is good, we don't think the

MK802IIIS is quite up to the task of being an all-in-one media and entertainment unit just yet. In fairness, though, it's not the newest device in the range. There's also a fifth-gen model, that, on paper at least, seems to perform better. Sadly, we couldn't get hold of one in time for this group test.

The RikoMagic MK802IIIS is priced at around £30, which is certainly cheap. Unfortunately, the device doesn't offer any more compelling reasons to buy it, so we can't recommend that you do.



▲ The amount of heat generated was worrying



# MyGica ATV585 Android TV Box

## DETAILS

- Price: £70
- Manufacturer: MyGica
- Website: [goo.gl/GBG9X7](http://goo.gl/GBG9X7)
- Requirements: Google account, keyboard and mouse for alternative control

**M**yGica is a relative newcomer to the Android media centre party, but its current line of products make for some interesting reading.

The MyGica ATV585 is one of the firm's mid-range units. It has a Cortex-A5 quad-core 1.5GHz processor, a Mali-450 quad-core GPU and 1GB of memory. The built-in 8GB eMMC flash storage has Android 4.4 installed out of the box, together with XBMC/Kodi, Chrome and a number of other apps.

There are a pair of USB 2.0 ports located on one side, along with an SD card slot, while the rear of the ATV585 houses an HDMI port, 100Mbps Ethernet, power, swivel antenna and micro-AV. Three small LEDs on the front of the device indicate a connection to the network through the Ethernet port and the status and power of the device.

Furthermore, the ATV585 has N-class wi-fi, Bluetooth 4.0 and an IR strip for use with the accompanying remote. Speaking of which, the remote is surprisingly good in this case. We often come across Android media boxes with terrible remotes, but the one with the ATV585 has solid buttons, a separate section for pairing with the TV and buttons for Android functions such as home,

▲ The MyGica ATV585 is similar to the Minix Neo, but it doesn't perform as well

► For £70, it's a fairly decent Android media centre

“ There's plenty to please users and it's reasonably priced ”

back and menu. You'll also find four quick-link buttons at the bottom for Netflix, Android settings, Play and XBMC/Kodi.

The ATV585 is certainly a quick little box. The apps load fast, and movement between already launched apps is fluid and without the stutter you often see with these kind of devices. Playback of video, from either an online source or from a local NAS drive and USB storage, was flawless.

There are a couple of niggles, though, which may let

it down. For one, the IR sensor seems to be a bit picky about what angle you point the remote at it. With a straight view, it works fine, but if you move slightly to one side, it tends to fail. And secondly, it tends to get a little hot after a couple of hours of streaming some HD content. It's not as hot as the MK802III media stick, but it does generate a fair bit of heat after use, and that's always a worry when you consider the longevity of the components.

The MyGica ATV585 is a good media centre. There's



plenty to please users and it's reasonably priced, but it does fall behind some of the competition, in terms of performance and features.



## Android And Chrome Media Systems

# Asus Nexus Player

### DETAILS

- Price: £60
- Manufacturer: Asus/Google
- Website: [goo.gl/HyxhAc](http://goo.gl/HyxhAc)
- Requirements: Google account, remote possibly

**W**e've already seen the Asus Chromebit reviewed in the pages of Micro Mart, but now it's the turn of one of its newer products: the Nexus Player.

The Nexus Player has some interesting features, which include a 1.8GHz quad-core Intel Atom processor, 1GB of memory and a PowerVR Series 6 GPU. There's 8GB of eMMC internal storage, around 3GB of which is dedicated to Android 5.0.

Connectivity comes in the form of AC 2x2 MIMO wi-fi, Bluetooth 4.1, a HDMI 1.4b port and a single micro-USB 2.0 port. The eagle-eyed among you will notice the lack of an Ethernet port, which seems like an odd design decision, because not all routers provided by routers can handle the faster wi-fi standard.

There's also no SD card slot, so you're going to struggle with extra storage beyond the five or so gigabytes left after Android 5.0 has finished updating itself. That said, you could opt for network storage, or you could plug in a USB stick by using a micro-full-size-USB adapter. Either way, it's another odd decision on the part of Asus.

The design of the Nexus Player, though, is impressive. It's a puck-shaped device measuring 120 x 120 x 20mm, with a glossy black



▲ The puck-shaped Asus Nexus is an interesting media centre



▲ It could probably do with a few design alterations, but on the whole, it's good

“Android TV is a one-stop shop for all your media content”

trim around the edge and a matte-black finish on top.

The included remote control is a simple affair, with

just four buttons surrounding a four-way control circle with an action button dead centre. It's well built and

sturdy, and the buttons are responsive.

The Nexus Player comes with Android TV, which is a one-stop shop for all your media content. There are a number of apps available for Android TV, including Disney Life, Netflix and Vevo. There are also media playing apps such as VLC, Archos Media Player and a couple of radio apps. However, it's a little sparse compared to what's available from the main Play store.

Playback of HD content via VLC works well, and 802.11ac is certainly fast enough for streaming content that's stored on, say, a NAS unit. There were no visible signs of the Nexus Player struggling with the media, but it did seem to take a while to get back to the home screen after we stopped playback. Presumably, it was loading up the available apps while still dealing with the streamed content from the NAS. We're guessing this is where an Ethernet port would have paid off.

Once there's more content in Android TV, there's little doubt that the Asus Nexus Player will be able to keep up. We look forward to it.



# Asus Chromebox

## DETAILS

- Price: £170
- Manufacturer: Asus
- Website: [goo.gl/tqaagt](http://goo.gl/tqaagt)
- Requirements: Google account, keyboard and mouse for alternative control

**C**hrome OS is most often associated with Chromebook laptops, but you can also find it in other form factors. Among them are all-in-one PCs and Chromebox devices, like this one from Asus.

There are three models of Chromebox available from Asus, a 1.4GHz Intel Celeron model (which we have here), an 1.7GHz i3-4010U model and finally a more powerful 3.3GHz i7-4600U. Each model comes with 2GB as standard but can be upgraded to 4GB of DDR3 1600MHz memory, and you'll find a 16GB M.2 SSD installed throughout the range.

As for connectivity, the Asus Chromebox has two USB 3.0 ports on the front of the device and a 4-in-1 card reader on one side. At the rear of the unit you'll find a further two USB 3.0 ports, HDMI, gigabit Ethernet, DisplayPort and a combo microphone and headphone jack. Furthermore, the Chromebox offers 802.11n wi-fi and Bluetooth 4.0 connectivity.

The Chromebox itself measures just 124 x 124 x 42mm. There's a slight angled cut-out from the otherwise square shape, with a mixture of glossy and matte-black plastic used throughout. It's certainly not an ugly device, and thanks



▲ *The Asus Chromebox is certainly a good looking device*

◀ *It's extremely capable and well specified too*

The cost of the Asus Chromebox varies depending on which model you get. The Celeron model can be had for around £170, but that price increases to around £500 for the i7 version. The top-of-the-range model is expensive, and you could probably find a similar machine of that size for slightly less, with Windows 10 installed too.

Nevertheless, the Asus Chromebox is a superb media centre machine and one we wholeheartedly recommend.

“ **Android TV is a one-stop shop for all your media content** ”

to the shape and size, there's plenty of connectivity to cater for most users.

Bundled with the Chromebox are a keyboard and a mouse, which while functional are probably too small to do any serious work with. They're also wireless and require a USB dongle to pair with the Chromebox, which means you'll lose one of your USB ports. Perhaps

a better choice would be for a Bluetooth keyboard and mouse to be supplied with the Chromebox or even an air mouse/QWERTY remote.

The HD content we had for testing ran perfectly well. There was no stuttering or lag when playing video, and the OS was quick and never once gave us reason to think the hardware was insufficient.





### Minix Neo X8-H Plus Android

With the right balance of performance, features and price, the Minix Neo X8-H Plus is this week's winner.

It's more than capable of delivering and streaming content, and it's a unit that'll last for some time before becoming obsolete.



### Asus Chromebox

Although it's the most expensive model on test, the Asus Chromebox is an impressive media centre.

It offers a high level of performance, and there's plenty of connectivity for even the most demanding users.

## How We Tested

Each unit was tested with a 42" LG TV and a BenQ BL2711U 4K monitor. Where possible, each unit was connected to a local network via Ethernet (or wi-fi when Ethernet wasn't present). We streamed a selection of 4K and 1080 HD content from a NAS on the same network.

	Mad Catz Mojo	Minix Neo X8-H Plus	RikoMagic MK801IIIS	MyGica ATV585	Asus Nexus Player	Asus Chromebox
Price	£95	£95	£30	£70	£60	From £170
Operating System	Android 4.2.2	Android 4.4.2	Android 4.2	Android 4.4	Android 5.0	Chrome OS
CPU	Nvidia Tegra 1.8GHz	A9r4 Cortex 2GHz	RK3066 1.6GHz	Cortex A5 1.5GHz	Intel Atom 1.8GHz	Intel Celeron/i3/i7 1.4GHz – 3.3GHz
Memory	2GB	2GB	1GB	1GB	1GB	2GB/4GB
GPU	Nvidia	Mali 450	Mali 400	Mali 450	PowerVR Series 6	Intel HD4000/4400
Storage	16GB	16GB	4GB/8GB	8GB	8GB	16GB
Wi-fi	802.11n	802.11ac	802.11n	802.11n	802.11ac	802.11n
Bluetooth	4.0	4.0	4.0	4.0	4.1	4.0
Ethernet	100Mbps	1000Mbps	None	100Mbps	None	1000Mbps



# Games With Real Celebrities In Them

We look at a selection of digitised famous people...

## 1 Apocalypse

In 1998, a third-person shooter called *Apocalypse* was released for the PlayStation. Created by Neversoft, it was twin-stick game, taking advantage of the consoles dual analogue sticks. It was also a game that involved a plot about an evil genius bringing about the end of the world. But most importantly, it was a game that invited the player to have an absolute blast, blowing bad guys with massive guns. Oh, and Bruce Willis was in it. Yep, as well as being on the cover and the main loading screen, Mr Moonlighting also provided a collection of catchphrases, which you'd hear almost constantly as you played the game. "These guys need a little more lead in their diet!" was one such pearl of Willis wisdom.

## 2 Wheelman

If you're going to make a game all about driving and cars and stuff, and give it a vehicle-related name like *Wheelman*, then why not go the whole hog and hire an actor with a name to match? Step in Vin Diesel. As well as appearing in the game in digitised form, he also voices his character, an undercover agent by the name of Milo Burik. Working with a gang in Barcelona, he has to help them plan a heist and, of course, drive around a lot in the process.

Along with the announcement of the game, it was revealed that a movie was in the works. The plan was for this to come at a later date, with the game setting up the background to the subsequent movie. We're guessing, however, that the later date wasn't 14 years, but that's how long it's been with no more word on the film, so it's probably safe to say it isn't coming. Then again, Mr 'Riddick' Diesel knows more than a few things about flogging a dead horse, so who knows?

## 3 Beyond: Two Souls

Not content with just one digitised Hollywood star, *Beyond: Two Souls* gave us two: Willem Dafoe and Ellen Page. Created by Quantic Dream, the same company that gave us *Heavy Rain* and *Indigo Prophecy*, it was an interactive story rather than what you'd normally call a game.

The plot, which revolves around a young lady with psychic powers, helped *Beyond: Two Souls* to get nominated for several awards, but reviews were mixed. Some people loved the story, but other weren't so enamoured and just wanted a proper game – something that actually involved a challenge.

We say if you really want a challenge, then try to look into the cold, dead eyes of digital Willem Dafoe without being a little freaked out.

## 4 Call of Duty: Advanced Warfare

Ever since Kevin Spacey revealed to the world that he is, in fact, Keyser Söze, his reputation in the acting world has grown immensely. Personally, we're more impressed by his turn as the bad guy in the Richard Pryor / Gene Wilder comedy *See No Evil, Hear No Evil*, in which he sported a rather smashing moustache.

But perhaps the true pinnacle of his career is when he became the CEO of the world's most powerful private military contractor, the Atlas Corporation. Of course, he's probably too busy running doing acting stuff to do that for real, but he does have time to fulfil this role in *Call of Duty: Advanced Warfare*.

Spacey's character, Jonathan Irons, might sell things that make people dead, but he's an awfully nice chap. Or is he?

Spoiler alert: of course he isn't.

## 5 50 Cent: Bulletproof

In case you didn't know, 50 Cent, as well as being a small amount of currency, is also the name of a rapper. (Fiddy to his friends; Curtis James Jackson III to his mum.) It's an odd career choice for a man who doesn't open his mouth, but it hasn't stopped him becoming hugely successful. And it hasn't prevented him from becoming an actor as well.

But Mr Cent is clearly a man with greater ambition than that – which is no doubt why he released his own videogame, *50 Cent: Bulletproof*. Famously, he has actually been shot and survived, but we're willing to bet the bullets passed through his skin rather than bouncing off it.

Perhaps that's why the sequel game had a more realistic title: *Blood on the Sand*.



▲ Just hope he never offers you a soggy cardboard box



# Online Comparisons

**Shopping online doesn't always require trawling reams of websites. Comparison services can help find the best deals**

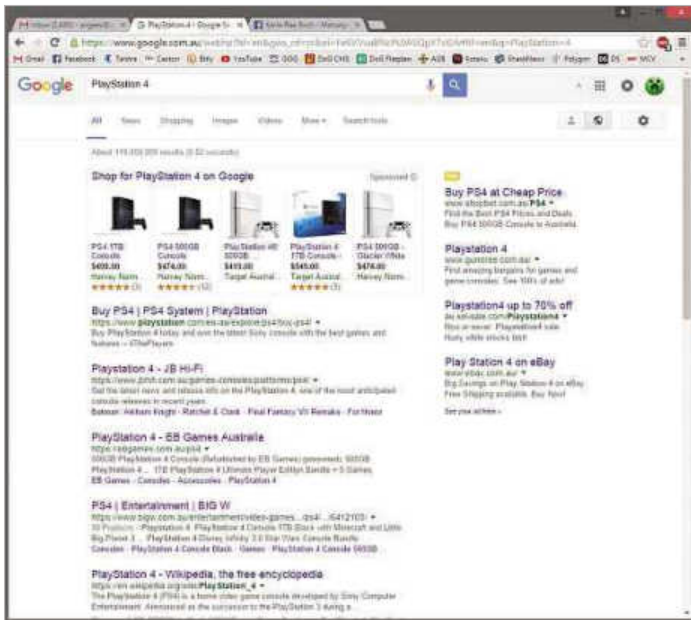
**A** good bargain is never unwelcome and no one would want to willingly pay more than they should if it can be avoided. The inherent problem here when shopping online is the sheer number of outlets and vendors you can buy from. Unlike your local high street or shopping mall, where there are only so many retailers to choose from, the internet holds innumerable options, all of whom will offer different stock and different prices. Some are better than others and some will save you money, while others may charge more. It's a commerce minefield and, unequipped, it can be difficult to find the best deals and save money. There are just so many possible deals to wade through and websites you may not even be aware of that could save you some cash.

How can one navigate this sea of sales? How can you be sure you're getting the best deals? Aside from trawling the

internet for days, painstakingly looking at site after site, which is effective, but time consuming, you could use a comparison service. These useful online tools do all the hard work for you and gather the best deals for your desired purchase, ranking them in order of cost and providing links to each offer. Now, that's a much more attractive proposition, isn't it? Of course it is, but there are still some things you need to consider and we'll look at these and some comparison services here.

## **Click And Compare**

If you've never used them, price comparison websites for PC hardware and software are like a lot of other comparison sites you may see on TV for such things as insurance and hotel bookings. They gather together deals that match your search criteria and present the results to you in a manner that's easy



▲ Google's comparisons are very useful

to read and digest. Many times, these sites are not limited to computer hardware and software, but for our purposes, this is what we're going to focus on.

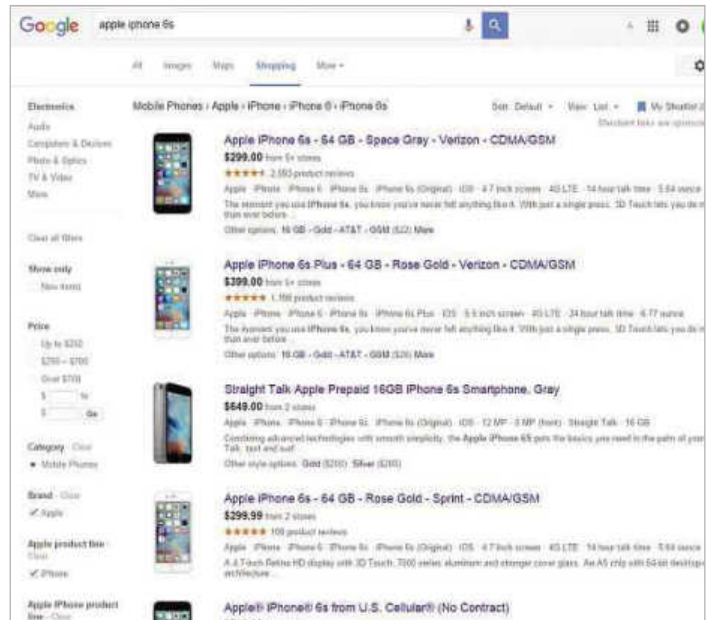
This listing of results eliminates the need to look through site after site and, importantly, could also deliver results from websites you may not even be aware of – so deals from them may otherwise have remained hidden from you. Just by using comparison sites you can find out about alternative vendors, perhaps even some that offer better deals than the sites you usually use.

Of course, the main goal is to find the best deals for you and this is the real benefit, allowing you to save money or find the best possible match for your needs. Most comparison tools will place the best offer at the top, followed by subsequent offers that decrease in value as they progress down the list (depending on your chosen filter). Given the size of the internet and the countless available websites around, even the lower items on the list are likely to be better value than most, so don't instantly dismiss options further down the page, you may still find something promising.

**“ It's almost hard-wired into us that any item found at the top of a list simply must be the best ”**

In fact, this leads us to one of our first tips. Many comparison sites operate just like any other website or media creation, in that they often use adverts to generate income. This can be found in the usual banner ads and pop-ups, but for listings, it can also be found in sponsored offers.

These offers will be from participating vendors who have paid for prime real estate on the comparison site, which will usually be at the very top of the list. This can be regardless of the actual value of the deal in question. This position is sought after by those looking to advertise as it's almost hard-wired into us that any item found at



▲ Google is one of the most used comparisons and for good reason

the top of a list simply must be the best, either in terms of quality or value. However, this may not be the case and you need to be careful. Always check for any advertisement-linked results and take their inclusion with a pinch of salt. The vendor has simply paid for this position on the list and it's presence doesn't necessarily reflect the best value option.

That's not to say sponsored offers will always try to rip you off or anything. Some may actually be the best options and that's fine, just be sure to check and don't get sidetracked by big, well-known vendor names, they're not always the best.

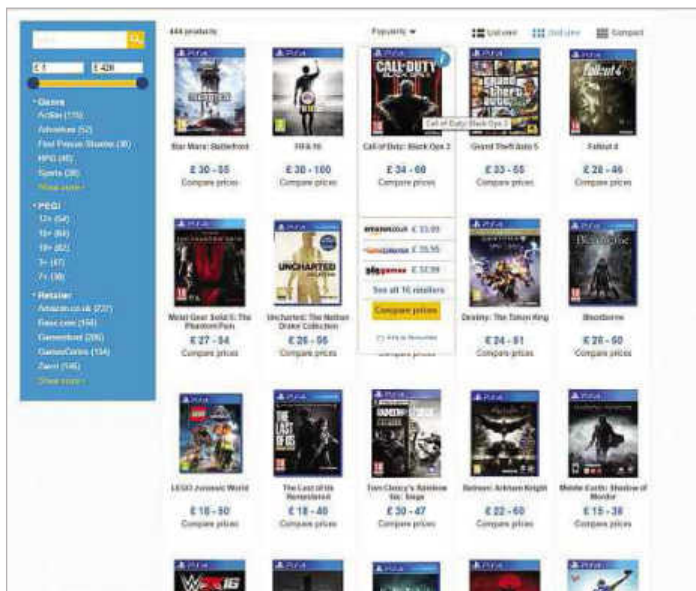
## Price Isn't Everything

The main reason for using price comparison tools is obviously to find a good price, but focusing solely on the advertised cost can be misleading. When looking for deals, even using comparison sites, you need to consider other factors that also contribute to a good deal.

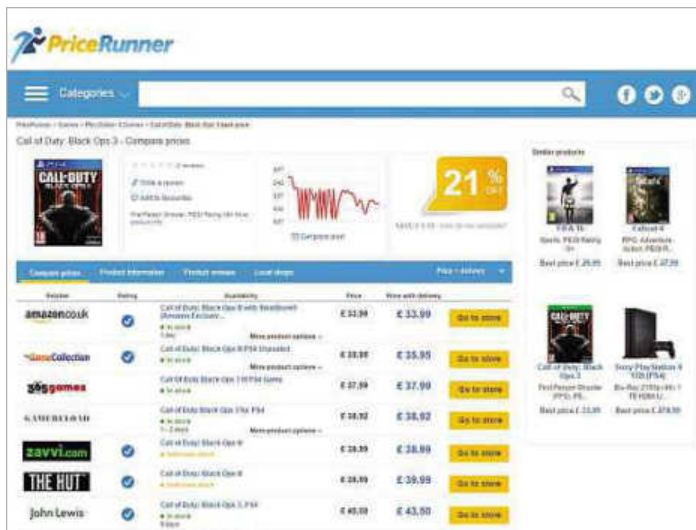
Advertised prices won't always include postage costs and these can offset any savings you make, rendering some deals that at first appear to be superior to be less desirable. This will



▲ Newegg is a major favourite of the tech-savvy



▲ PriceRunner's pop-up comparisons are great for casual browsing



▲ PriceRunner has some of the easiest to use comparisons

usually apply to any items that are sent overseas, but even local shipping can be costly for large items, so don't take the listed price as final and always drill down.

Likewise, some deals may encompass additional items or services, which could make up for a higher cost. For example, you may be looking to buy a games console, with the cheapest deal offering the console only. A more expensive deal may also package in some games, which could actually save you more money, cutting a cost from buying the games individually. Always check the specifics of a deal, as these may not always be indicated in the initial comparison listing.

Warranties are often an important consideration, especially with higher-end hardware. Not all vendors will offer the same warranty, so be sure to look into this too. A slightly more expensive option may be worth the money if you have a longer warranty to fall back on if needs be.

## Caveat Emptor

Although most comparison sites will usually list results from major online retailers and well known names, you'll often find listings for sites you may not recognise. These smaller sites

will often have some very attractive deals, bettering the larger names, so they're always going to generate interest. However, as with any new online store, you should always do your research. If you're thinking about buying from a site you've never heard of, look into it and see if it's safe. Check other comparison sites to see how often it's listed and visit the site itself. How professional is the site? What kind of payment options does it have and does it have encryption security on any pages requiring personal information and payment details?

A good way to get a simple feeling for a site is to email the customer service and ask for some assistance on a product. You can see how fast a response is and how well the site does at communicating with customers.

One of the best ways to check a site or vendor's integrity is to read customer reviews. Customer feedback is an integral part of other sites, like eBay, and it can be very useful barometer for gauging the legitimacy of any given offer. This is also an essential step to take when buying anything online, regardless of the site you're on. Make note of any comments about the vendor's service and support.

You'll want to know that the item you're buying is exactly as advertised for the price and is good quality. Customer feedback is a great way to check whether this has been the case in others' experience, and often gives a good cross-section of opinion that can help you with your choice. For example, there's no point in saving money via a comparison site if the offer you choose is from a company that is notoriously poor at packaging its items (leading to damage) or is not as advertised.

## Compare

Like the vendors they compare, there are many different comparison sites, some of which are better than others. Let's look at just a few, starting with one of the most popular

## Google Shopping

There's no doubt that Google knows searching, it's what the company started out with – and it's a market it still dominates. As such, it's only fitting that the search engine is also one of the best shopping and comparison sites available online. Google Shopping is more than a simple comparison site, though, and also offers a fully customisable search that lists relevant offers and allows the use of user-chosen filters to better compare possible deals.



▲ PriceGrabber's interface isn't as clean as some, but still useful

The screenshot shows the broadbandchoices.co.uk website. At the top, it says 'We have found 51 deals for your postcode: SK11 7EL'. Below this is a table of broadband deals. The table has columns: Provider, Contract Length, Speed, Usage, Calls, Offers, Costs, and Email results. The providers listed are plusnet, TalkTalk, sky, and (fuel). Each row shows details for a specific broadband package, including contract length, speed, usage, and cost. For example, the plusnet package has a 12-month contract, 10Mbps speed, and a cost of £50 per month. The TalkTalk package has a 12-month contract, 10Mbps speed, and a cost of £100 per month. The sky package has a 12-month contract, 10Mbps speed, and a cost of £50 per month. The (fuel) package has a 12-month contract, 10Mbps speed, and a cost of £1.00 per month.

▲ Always make sure you get a good comparison of broadband suppliers before committing

With dedicated categories, price ranges, brands and even specifics such as storage capacity and resolution for cameras, there's a great set of tools you can use to narrow down your searches for the product you're looking to buy.

Alongside the actual shopping site you can use, Google's all-encompassing nature means a simple web search can also yield results, as comparisons are often worked right into your searches, giving you a quick run down of some offers you may find interesting.

However, as good as Google may be, and as useful as the custom settings are, the site is also heavily ad-focused and Google is one of the worst offenders when it comes to placing sponsored results above all else. Keep this in mind when using Google to compare prices and always scroll down to see all offers, including non-sponsored ones.

## Newegg

Although Newegg may not be a huge corporation like Google, or run an entire search engine, it's still one of the best online price listing and comparison sites you'll come across. In fact some may say it's the best. Like Google's option, Newegg features a whole set of filters and options for fine tuning your search and there's a whole collection of departments, ranging from hobbies and toys, to PC components.

One of the most useful tools at your disposal is the ability to select up to five items to place in a side-by-side comparison. This not only lists the price, but also a run-down of the specifications features of the items selected and this also includes shipping costs, making it very easy to narrow down your selection and pick the best option for you.

Like Google's sponsored links, Newegg also has a list of featured sellers, but these aren't usually forced into listings and are found when they're relevant to searches and within their own section of the site. In fact, sponsored products are listed

right at the bottom of your search and are not intrusive at all, which is nice.

## PriceRunner

As with other sites, PriceRunner has a wide range of categories, with a few filters you can use to narrow things down. The main thrust of the site, however, is the price comparison element, which is handled a little differently.

Items are listed as normal, but here you can roll over individual items to see a brief price comparison of the top three sellers. Clicking the price will take you to the deal. Of course, there are more than three options for each item and clicking to drill down will take you to a full, detailed run-down of the various offers, with a full listing of sellers.

## PriceGrabber

Although not as well laid out as other comparison sites, PriceGrabber is a decent place to compare deals for a wide range of items. The main menu has a large number of categories and as to be expected, you can utilise a range of filters and options to fine tune your search.

Comparisons can be performed between four items at a time and although it's a little more basic than other sites, it's a useful, easy to read output that shows you prices and availability, as well as supplying customer reviews and some specifications if relevant.

That's just a few comparison options you'll find online and each is a great tool to have to hand if you're looking to find the very best, most suitable deal for you. Give them a go for yourself and see which suits you best. [mm](#)

## Broadband Comparison

Broadband packages are many and varied, with different costs, allowances, limits, benefits and much more. The different suppliers all offer their own rates and the sheer number of deals can be confusing and often misleading. This is where price comparison sites can a huge help and they can cut through the jargon and reams of conditions to give you the best, most suitable contract for your needs.

Sites like [www.broadbandchoices.co.uk](http://www.broadbandchoices.co.uk) and [www.gocompare.com](http://www.gocompare.com) are great examples of this, with the latter offering comparisons for a wide range of other services, not just broadband. Using these you can perform a quick search using your post code or address and find the options open to you in your area. This includes deals from a range of ISPs and the ability to see options for broadband and phone or broadband only.

For example, Broadbandchoice places all the available options into a simple table that shows contract length, speed, usages, specific benefits and the cost. There are also customer reviews and star ratings for each ISP, so you can quickly see which ISP has the best overall performance in terms of public opinion. This can be essential information for picking the right ISP for you and your area.

If you're looking for a new broadband contact, comparison sites like this are essential, pure and simple. It's very important to see the pros and cons of an ISP before you're locked into a fixed contract and these sites let you get this information easily.

# The Rise Of The Ecosystem

**Mark Pickavance discusses how technology ecosystems evolve, and their role in our purchasing choices**

**T**he concept of an ecosystem is one that we all learn early in our education, often following a school day out to a local pond.

A hierarchical arrangement of species is presented in the context of their habitat, and how this creates a stable and sustaining environment for those living things within it.

Man has long emulated these structures within our societies, as we moved from largely nomadic existence to cultivation and animal husbandry. As the industrial revolution took hold, many companies realised that a superior plan to selling individual products was to provide a collection of related ones.

One of the first to consider this was Samuel Colt, who in 1855 founded Colt's Patent Firearms Manufacturing Company. At that point, he'd been making firearms for nearly 20 years.

In the early days of revolver manufacturing, ammunition was custom made for each weapon, and it was uncommon for weapons to share bullets or any components even from the same company.

Colt realised that a degree of standardisation would allow him to provide cheaper ammunition and also share complex elements, like the revolver cylinder.

This paid off when the transition from percussion loading to cartridge ammunition came along, as Colt weapons could have their cylinders exchanged and convert to using more

TELEGRAMS:—"TOLLEYBANK, LONDON."

## J. & W. TOLLEY,

GUN AND RIFLE MANUFACTURERS,  
1, CONDUIT STREET, LONDON, W.,  
Manufacture:—PIONEER WORKS, BIRMINGHAM.

### SELF-EJECTOR GUNS.



The Times says:—"A perfect & perfect gun."

Cash Price 25 to 47 Guineas.  
Non-Ejector Hammerless 15 to 25  
Hammerless 10 to 20  
Knapen's Guns 25 to 47 Guineas.  
We have a 10 yards shooting range on the premises where guns may be tried before purchase. Gunsmiths especially fitted by the Adjustable Try Gun which can be altered in any day and fresh, at our private shooting range.

### LONG RANGE WILDFOWL GUNS.

Guaranteed Performance

10-BORE at 100 Yards.  
8 = 120  
4 = 150  
10-BORE -- from 10 Guineas.  
8 = 120  
4 = 150

From "Wildfowl" of the Field.  
"I have never seen in the course of my shooting career a more powerful Gun than the 10-bore central fire you have made for me for wildfowl shooting."  
"It is very little heavier than an ordinary gun, it is quite as easy to handle, its finish and make are perfect, and certainly its point of actual work, I will say, emphatically, that it leaves far behind all the guns I have yet handled myself, or ones handled by others."  
From J. F. GARRATT, Esq., Wilmington Manor, Bedford.  
"I have given the 10-bore Double a good trial, both at day and night, and like it immensely. I have shot plover at 120 yards with it, bring into a flock."  
From The Field, August 19.  
"Successive times I have shot."  
"Sixty—At the wildfowl season is fast approaching, I send you yours obtained from a new double before, both for me and my Messrs. Tolley, thinking they might interest some of your readers."  
"Six shots at single birds, 115 yards distant, killed second, fourth and fifth shot; the fourth flew away for about thirty yards, and then dropped dead. One shot at six plovers 127 yards distant, killed two. One shot at thirteen ducks, 141 yards distant, killed four and wounded another. One shot at about 120 plover, 147 yards distant, killed six and wounded two others, which we afterwards bagged."  
"HARRINGTON."  
From Hon. R. PETER GARRATT, Esq.  
"I send you 4 more for the first time the other day in Ireland, and put in one shot seven wildplover, four teal, and two curlew. I consider it beautiful."  
It is a Special Feature of these Guns that they are **Handy**, enabling them to be used by the **average Sportsman** with comfort and success.

### NEW B.L. PUNT GUN.

### "UBIQUE" BALL AND SHOT GUN.

AN INDISPENSABLE GUN FOR INDIA AND THE COLONIES.



A 10-bore Double Gun of the ordinary weight (about 5 lbs.) firing from both barrels—shot with the pattern and penetration of a 7-bore shot gun, and hollow pointed, solid or shot tipped, conical, bullets up to 100 yards with the accuracy of an Express rifle; also spherical bullets with large powder charge for great shock. Prices from £15 15s.; also made in 16, 18, 20 and 4-bore.  
"A 4-bore 'Ubique' firing 10 drams or a 10-bore firing 4 drams and an Express Double rifle makes a useful and inexpensive battery for sport in any part of the world."

### EXPRESS RIFLES,

400, 450, 500, and 577 Bore.  
SMOOTH BORE RIFLES.

Accuracy, Reliance of trajectory, and smashing power highest standard. Prices from 20 Guineas.

### "MAGNUM" EXPRESS RIFLES.

"Magnum" 577-bore firing 6 1/2 drams and 645 grain bullet, as recommended by Sir Samuel Baker in his book "Wild Beasts and their Ways."

### BIG GAME RIFLES,

12, 10, 8 and 4 Bore.

### "ALTRO" 12-BORE GAME AND WILDFOWL GUN.



A Double 12-bore Gun, bored to take long or short Cartridges in both barrels, and firing out of 3 to 4 drams powder, and from 1-oz. to 1 1/2-oz. shot—this making this Gun equally useful for ordinary game as well as wildfowl shooting.  
Prices from 13 Guineas.

### SHOT CARTRIDGES.

See New Price List.

▲ Gun makers in the 19th century realised the value of creating ecosystems, and it's something tech businesses embrace today

convenient and quicker-to-reload brass rim fire cartridges. This level of interchangeability and the supporting of very specific calibres contributed to the success of Colt, and they paved the way for other equipment makers to consider their products as a range or ensemble.

At the same time that Samuel Colt was arming the western pioneers, furniture and fabric makers were also developing the notion of collections and promoting them to potential customers through the new concept of the printed catalogue.

By the time that computers came along more than 100 years later, the idea of locking customers into a product ecosystem was an old one, and it readily embraced by those that made them.

IBM did it with its mainframe hardware, and Apple did it with its personal computers. The idea, of course, is that the

initial purchase doesn't need to be the end of the selling opportunities.

## The Classic Ecosystem

When you think about a technology ecosystem, the company that immediately comes to mind is Apple, because of the enormous success it's had using this business.

Long before Mac OS X and iOS, Apple had been delivering ecosystem solutions by using proprietary connectors to support its computers. If you wanted a printer for your Mac, you could

“ This model has been described as a ‘walled garden’ where Apple decides what can be on the app store and what can’t ”

only use one that was approved by the Apple, and it made money on every one – even those it didn't make.

But the real innovation came when Apple launched the iPod and its associated selling channel, iTunes. If you wanted music on your iPod, you needed iTunes, and the only concession that Apple made to the world on that point was to release iTunes for Windows.

Once iTunes was established, it evolved into the iPhone App Store, a complete control and exploitation system for all software and content that would be put on Apple phones and tablets.



▲ Apple Pay is now supported by many UK banks. Shame you need to own an iPhone 6 or 6 Plus to use it, isn't it?





▲ Rumours persist that in the iPhone 7 Apple will remove the 3.5mm audio jack, so it can sell you a cable to convert to whatever it does use to work with your existing headphones

This model is often described as a ‘walled garden’, where Apple decides what can be on the App Store and what can’t.

That a developer spent a year of his working life on a project is irrelevant to Apple if it decides that it would like to make a similar app itself or add that type of functionality to iOS. It’s Apple’s ecosystem and Apple’s rules, which it can change at any time it likes. That’s not great for the developer, but it delivers a highly controlled and consistent user experience that many customers like.

Alongside this services ecosystem, it’s also flouting global initiatives on standardisation by using proprietary connectors. That means third-party hardware makers can’t make peripherals without paying ‘Apple Tax’.

These policies have helped Apple to become one of the most profitable companies on the planet, as it’s retained a large market share by binding its customers into a system that’s rigidly controlled in terms of what it embraces and what it doesn’t.

It also tries at every opportunity to create an extra layer of convenience for those who own all the Apple gadgets, by allowing them to work in a seamless fashion. This comes from being in total control of the hardware design and software upgrades.

However, it is worth pointing out that on a number of occasions, Apple’s complete control has actually been counterproductive, when it’s released updates that have bricked devices or disconnected people from their products. In one infamous instance, it mistook the musical preferences of its own CEO for every one of its paying customers.

Being king of your specific castle is great until you make choices that negatively affect everyone and that can’t be easily blamed on anyone else.

The success of the Apple ecosystem has spawned many imitators, all intent on creating their own isolated markets, where they makes the rules and everyone pays them for the privilege of being inside the walled garden.

## The Advantages

As I’ve already eluded to, the primary advantage of a product ecosystem is for the company/brand in question. It gets to sell you multiple related products and effectively lock you into its business model.

Once you’ve invested lots in one ecosystem, it’s hard and expensive to suddenly switch to an entirely different one, especially with companies actively working to scupper interactivity outside their product range.

However, there are a few advantages that the customer gets with the deal, a bonus for sticking with a particular company and dancing to its tunes.

One of these is generally superior interoperability, as represented by Apple’s assertion with some of its products that they ‘just work’. Being able to

► **Want to write an app for the iPhone?**  
**No problem, but never assume Apple will let you sell it – or keep selling it once it is on the App Store**



completely control hardware at some level enables interactions to be fully tested before product launches, and for the on-board software to be tweaked to get the very best out of the unchanging hardware.

This was one of the arguments that Apple put forward for why the Macintosh was always better than the PC. Windows was designed to run on a remarkably wide selection of hardware, and most of the combinations had never been tested. It could never be as slick as Mac OS X on a device built just to run that OS.

In the same way, Apple battery life on its devices has always been considered a strong point, because it's tweaked iOS to get the most out of the hardware and designed that hardware for iOS to tweak.

The counter argument to this is that you can build a PC that's much more powerful than anything in the current Apple Mac range. Apple doesn't make many models, and it doesn't use some of the more exotic processors that Intel or AMD make, or the best video cards.

## “ If you buy a shoe and use it as a hammer, then that's generally your choice ”

By its very nature and philosophy, Apple hardware isn't designed to be as flexible as a PC, so you can't combine it with third-party hardware in the same relaxed way.

In this respect, the PC ecosystem is a wider church and able to embrace smaller niche markets through third-party accessories and software, with little or no control over who comes to the table and no revenue link back to Microsoft.

In the Apple world, while it supports external devices in respect of Thunderbolt and other port technologies, the only significant accessories it actively supports are software ones.

And through the App Store, Apple has managed to take a slice of every sale when, other than the ecosystem, it's contributed little to its creation other than to define an API and maybe contribute some development tools.

According to Apple, there's a reason for its restrictive practices in deciding what can and cannot be sold in the App Store. It means the products are of a higher quality, and you get a standard of 'user experience' that wouldn't be possible in an open environment, like Android.

These are well worn arguments, and regardless of whether you agree, they've helped Apple to become one of the most profitable companies in the world. However, there is a significant flip-side to this arrangement.

### The Disadvantages

Once an ecosystem has been created, or as it's evolving, usually those behind it start creating a legislative structure that says what those who enter it can or can't do. That includes any company wishing to interact with ecosystem technology or customers, and the customers themselves.

At the heart of these relationships are EULAs (end user license agreements), patents, trademarks and commercial contracts.

If you've ever taken the time to actually read a EULA and understood any of it, you've probably mused at the wide scope of limitations that are imposed on the implicit signatory.

Some of this is unique to technology products and services, because if you buy a shoe and use it as a hammer, then that's generally your choice, but buy an iPhone and use it in a way that Apple hadn't intended, and it can become very litigious.

But rules are rules, and you should be familiar with what you're signing up to when you join an ecosystem, right? Yes, but those who run some of the most tightly controlled ones have a tendency to change those rules or extend them whenever they feel like it. That doesn't seem entirely ethical, does it?

When your phone, for example, gets a system update and you read the EULA and don't like the contents, your choices from that point onwards are limited.

Ignoring the update might break compatibility with apps when they themselves get upgraded, or your phone might stop working eventually.

The other problem is in situations like the Apple App Store is that there effectively aren't any rules. Apple doesn't feel compelled to tell developers why their software wasn't allowed in or why it's been withdrawn after already being on sale for a while.

On occasion, the reason is that Apple decides to create its own version of that app or to bind the functionality into the next iOS release. That's pretty harsh for a developer if the software in question is their livelihood and took significant effort to write.

Even if you were a lone coder who wrote apps just for yourself, you couldn't put them on the iPhone officially without Apple's agreement.

That's one tick against ecosystems, and the other is cost control or rather the lack of free market economics.

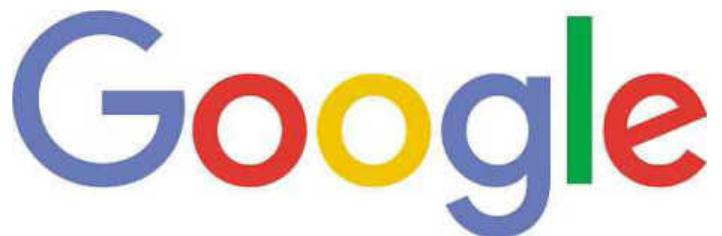
### Cost Implications

Imagine for a moment that you've bought a Porsche sports car and you intend to take it to a track day racing event. As you've invested heavily already, you also decide to splash out further by getting the right attire, and you head to a specialist racing shop where they have all that gear.

There you find two jackets, both of them are nice, and one of them is the official Porsche branded type and has the logo emblazoned on it. You know, probably from bitter experience, that the branded jacket is going to cost more and that because it's part of the ecosystem of owning that car, you'll pay for it. The jacket cost no more to make or import, but it will be much more profitable for the stockist and indirectly for Porsche, which licenses its branding.

Exactly the same happens with products that are part of an ecosystem, even if they're not officially endorsed. This is why in the Apple ecosystem you see connectors that get rapidly replaced and proprietary connections that only Apple uses.

When the iPhone 5 shipped in 2012, it had a new 'Lightening' adapter, an eight-pin connector that replaced the also proprietary 30-pin one.



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▲ *Apple loves proprietary connectors, because they make lots of money and they enhance its control of its ecosystem*

That meant that anyone who had an iPhone 4 with additional chargers or a docking station could junk all that stuff, because it wouldn't work with their new iPhone. Apple made an adapter to convert from one standard to the other, but it cost £25.

It's been estimated that in extra cables and converters Apple made an extra \$100m that year, but that's nothing compared with what it makes by licensing the Lightning port and the shape of its phones for covers in a typical year.

The port cannot be made by any company other than Apple, so if a peripheral needs to connect to an iPhone or iPad, then the company making it must go and buy the connector and its associated chip from Apple.

What Apple charges for the chip and connector hasn't been made public, but it's generally accepted that cable makers pay at least \$3.50 or \$5 to have it when it only cost Apple pennies to make. This helps explain how Apple cables ended up costing ten times what USB cable for Android phone do, while basically performing an identical function.

Proprietary solutions are always an opportunity to extort the customer, and once a strong ecosystem is established, many companies just can't resist the temptation to do exactly that.

I've mentioned Apple rather often, but it's not the only one doing this sort of thing. Laptop makers, for example, are more than happy to pump out products with a wide range of differing chargers.

Proprietary standards are a way of making things artificially more expensive and therefore more profitable, in addition to maintaining a vice-like grip on the ecosystem.

It's worth mentioning that many companies do exactly the same thing with virtual connectors in their operating systems, allowing only 'approved' devices to connect. From the company perspective, they need to milk their ecosystem cow, because their life expectancy isn't great.

## Over The Hill

In the last decade we've seen the biggest technology ecosystem, Microsoft Windows, hit a series of commercial potholes and be dethroned as the most prolific operating system in the world.

The decline of Windows, or more specifically its relevance to the world of computing, started with numerous changes that happened about the time that Windows XP was launched. However, it really came home to roost when Apple launched the iPhone, and the world went mobile computing crazy.

Ironically, it was Microsoft itself that had been downplaying the importance of Windows for some time. When the Xbox 360 launched, it framed it as the replacement for PC gaming.

While predictions of the death of the PC for gaming now seem wildly inaccurate, what they did accidentally get right was that the PC ecosystem was in a delicate balance, where it could easily be overtaken by more accessible technology.

Once the iPhone and then the iPad arrived, those who couldn't be bothered to learn how to use Windows had an immediate alternative, and they weren't even put off by Apple's incredibly restrictive ecosystem or eye-watering prices.

Microsoft threw gasoline on the iPhone/iPad fire by not taking any of this seriously, ignoring the Windows Mobile division and generally undermining its own product line.

When it did finally react, with Windows 8, it was so completely knee-jerk that it managed to top the previous debacle of Vista with a version of Windows that almost everyone disliked.

What Windows 8 also highlighted was that with the success

“ **Proprietary solutions are always an opportunity to extort the customer, and many companies just can't resist the temptation** ”

of Windows as an ecosystem, Microsoft had failed to keep it unified as the years went along. Like some medieval feudal king who conquered a massive land and then let parts of it self-administrate, the Kingdom of Windows spoke many dialects, not least the ancient tongue of Windows XP.

Each new release compounded the fragmentation, and as we approach two years after all support was withdrawn, there are still nearly 11% of PCs running it.

Microsoft's rather drastic answer has been to make Windows 10 free to existing Windows 7 and 8 users, in a desperate but possibly too late attempt to bring all Windows users under a common platform.

In many respects instead of driving the Windows ecosystem and making it central to the company's plans, Windows 10 has become a lifeboat launching exercise, where some of the customer base can be saved, if they can be persuaded to put their Apple/Android phone and tablet down for five minutes.

All ecosystems blossom and then ultimately decline, mostly because those who control them become complacent and disconnected from their customers.

Windows is such a big one that it will be around for many years yet, though it's no longer at the sharp end of computing technology, and it's been successively diminished by time and tide.



▲ Microsoft is trying to create a Windows 10 ecosystem, in which the same OS is available across many form factors

## Final Thoughts

Someone once said (I'm not entirely sure who) that once a company starts circling the wagons and protecting its small patch of territory, it's already too late.

Once you've defined the scope of your influence so precisely, then your competitors can nibble at that, confident that you won't be launching into sectors that they have a solid hold on.

Also, when you become entirely focused on a defensive posture, then it's much like a medieval siege, where it isn't a matter of if you'll capitulate but when.

Ecosystems start out as something designed to bond people to your vision of the future, but they end up as a creative ball-and-chain. And those using them become increasingly resentful of the external control being applied to them and their purchasing choices.

In varying degrees, this has managed to turn many people off Apple, Google and Microsoft, to mention the biggest purveyors of ecosystem thinking.

It generally comes down to where each user has their line, and at what point that company crosses it for them. Personally, Apple crossed my line of death a long while ago, Microsoft is something I put up with but wish I didn't, and currently Google I'm moderately accepting of. That's where I am today, but tomorrow might be different. Others have already moved outside all those ecosystems, and I can accept that.

What's fascinating as a technology pundit is how depending how they're doing commercially a company can transition from being very paranoid about its ecosystems to a much more pragmatic stance.

A classic example of these shifting sands is Microsoft's relationship with Google and the world of Linux (from which Android has evolved). In June 2001, then-CEO of Microsoft

Steve Ballmer said, "Linux is a cancer that attaches itself in an intellectual property sense to everything it touches."

That was said in a context where Microsoft owned the biggest technology ecosystem in the world (i.e. Windows), and as a company it only supported its own OS and Apple's through a long-term investment agreement.

What people wanted, although Microsoft refused to even consider it, was Office for Linux – something we'd surely have seen if the Office part of Microsoft had been floated off after the antitrust case it lost in the USA.

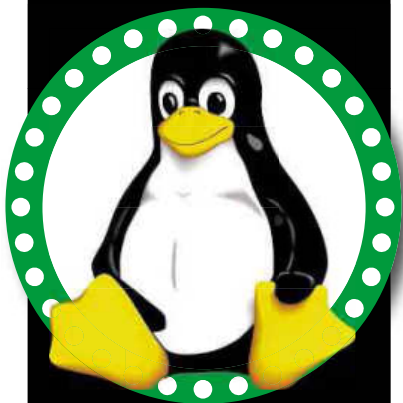
In 2001, with Microsoft in the driving seat, it felt remarkably confident to call Linux a 'cancer', never considering that it would be one that it would need to work with when Windows fell from grace.

Moving forward to today, Microsoft has entirely failed to carve out any substantial niche in the smartphone market, and it's now relying on both Apple and Google's operating systems to sell its services. The mobile version of Office was available on Apple iOS and Google's Android before it came to Microsoft own mobile operating systems, because that's the business reality of today.

According to Microsoft, some of its own technology is in Android, and it's managed to run a successful licensing scheme that nets it more than a billion dollars a year. How those tables have turned...

That companies can flip-flop like this when the political wind changes direction shouldn't surprise us, because they answer to their shareholders and are not paid a bonus based on any sliding scale of hypocrisy.

Those that believe that Microsoft can reinvent its business model and regenerate the Windows ecosystem should consider that numerous tech companies have tried to do this in the past. And, ironically, with the possible exception of Apple, they've all failed. [mm](#)



David Hayward has been using Linux since Red Hat 2.0 in schools, businesses and at home, which either makes him very knowledgeable or a glutton for extreme punishment

# Linux

# Linpus Lite 2.2

## Fancy an updated touchscreen Linux distro?

**L**inpus Technologies has recently launched the latest version of Linpus Lite, a 64-bit Fedora-based distro that enjoys a more commercial standing in its native Asia. This 2.2 release has a number of changes over the previous versions that bring it kicking and screaming into line with the 21st century trend of 'swishing' the screen with your fingertips.

Yes, touchscreen support is here and built around a system that boasts incredible boot speeds, ease of use and improved productivity. It's a slick looking interface, that's for sure. Built around a modified Cinnamon desktop environment and enjoying some redesigned and creatively engineered HTML5 panels and widgets, you could easily be forgiven for thinking that Linpus was actually a customised version of Chrome.

The façade is extraordinarily close to Microsoft's much maligned Vista operating system, however. It doesn't have to remain that way, though; widgets display the weather, a calendar, RSS news feed and the obligatory analogue clock, but they can be removed and/or configured to your particular settings. Strangely, when we tried to add new widgets nothing appeared to happen, so perhaps this is something that will appear in the future.

The widget panel on the right of the screen, called Daily Widgets, can be turned off or removed altogether, via the Power button in the top right of the screen. There's also a quick launch bar on the left edge of the desktop, which can also be

removed in favour of a more Gnome 3 feel by enabling Icon Mode from the Power Menu.

### Does It Work?

A few programs make an appearance: Chromium, LibreOffice, a handful of games and so on – but, alas, there's no VLC or Firefox. The Application Centre is where you can go to install your favourite packages, however, and as a result it has been designed as an all-in-one updater, installer and viewer of already installed programs, very much like the Google Play Store. Clearly Linpus has seen the benefits of the mobile world app stores and catered for them by implementing HTML5, as your Web Apps and Chrome Apps can be synchronised and supported. It's a shrewd and clever move from the Linpus development team, and to a degree it works reasonably well.

Naturally the onus here is on the touchscreen integration for modern tablets, desktops and laptops. The previous version 2.1 of Linpus Lite felt very sluggish when in touchscreen mode. The various widgets, gestures and so on didn't always work the first

few times, leaving the user somewhat frustrated with the distro. However, 2.2 seems to have improved in this respect, and although there were some miss-touches, it worked reasonably well.

The problem, though, was with other aspects of Linpus Lite. We found that it had a tendency to misbehave during more intense computing moments; when a program is launched, everything else appeared to freeze, and there was a sudden rush to catch up once the system had finished what it was doing.

Booting up Linpus is, as the developers claim, very fast – a matter of seconds in fact – but, once in the desktop, all-too-frequent slow-downs and a general unresponsiveness marred the potential for this to be an true x86 contender for Android or Chrome.

There's a lot of potential here, and some finely crafted work on the looks of the system, but it's in need of some further development before you can seriously use it on touchscreen technology in commercial or home setting.

▼ *Linpus Lite 2.2, a decent touchscreen-capable Linux distro*



# What's In A Name?

**It looks like Apple's about to rename its operating system. Hello, Mac OS... again?**

**N**aming conventions can become synonymous with a brand, to the point they're hard to shake. Not long after Steve Jobs returned to Apple, whacking a lowercase 'i' in front of everything appeared to be the way forward. We got the iMac and the iBook, which revolutionised Apple's computing line-up. We never found out what the 'i' stood for, but Apple continued regardless, giving us the iPod, the iPhone, and the iPad. Reportedly, only the threat of litigation stopped us getting an iTV.

Things change, however. We don't head into an iStore for an iWatch, even if commentators online can't kick the iHabit and refer to Apple Stores and the Apple Watch using those terms (thereby making editors want to iSlap them). Similarly, a great many people still refer to the Mac's operating system as Mac OS; but that one might not be an issue for much longer, since that particular name might be making a triumphant comeback.

For a long time, of course, the operating system for the Mac made no reference to the host platform at all. Although it was originally, unimaginatively, named 'Mac System Software', Apple soon ditched the 'Mac', called the OS 'System Software', and eventually largely ditched the 'Software' bit as well. When needing to differentiate a new release from its predecessor, the number was incremented. So we got System 5 and its MultiFinder that enabled you to run several applications simultaneously, the surprisingly long-lived

System 6 (1988-to-1992), and then various flavours of major upgrade System 7.

Apple had a rethink with version 7.6, however, which became Mac OS 7.6. This may well have been to ensure there was some Mac branding welded to the Mac clones Apple had allowed at the time, in an ill-advised and near-disastrous attempt to increase the platform's marketshare.

In 2001, Mac OS X arrived in all its Fisher Price 'Aqua' glory, but eleven years later the 'Mac' disappeared. Mac OS X Lion gave way to OS X Mountain Lion, resulting in a flurry of speculation that the Mac itself was on borrowed time, or that Apple's operating systems were to merge across platforms. Frankly, it's more likely that someone at Apple thought OS X sounded cooler, but now everything's become a bit clunky.

OS X sailed past version 10.9, to 10.10 and 10.11; this year, we'll get OS X version 10.12. It's no wonder Apple mostly ignores those numbers, instead preferring big cats and now California landmarks when referring to its desktop OS. There are feelings that even the big 'X' is looking long in the tooth.

More to the point, it's now inconsistent. Elsewhere, we have iOS for Apple's mobile devices, watchOS for Apple Watch, and tvOS for Apple TV. Logically, then, we'll in the near future be bidding goodbye to OS X and welcoming macOS. Interestingly, at Apple's quarterly financials call in January, Apple CFO Luca Maestri said the company had "built a huge installed base around four platforms", which he listed as "iOS, macOS, watchOS, and tvOS".

That could have been a slip of the tongue, but there have been further hints regarding some kind of imminent change. And it comes as Apple finds iPad sales flagging but the Mac having a surprising resurgence in a PC industry otherwise seemingly in terminal decline. That all said, Apple's never been one for absolute consistency – after all, we're not carting about Apple Phones, Apple Pads and Apple Pods, although replacing iMac with Apple Mac would give us something long-time Mac Users would argue has a nice ring to it!

▼ *Our artist's impression of how OS X El Capitan could look soon*



**Craig Grannell is a writer, designer, occasional musician and permanent loudmouth. He's owned Macs since 1996, when Apple was facing certain doom, and is therefore pleasantly surprised by its current success. Find Craig on Twitter at @craiggrannell**

# Mac



Ian is a professional IT analyst, a semi-professional writer and a pretty amateur electronic musician. He likes gadgetry and loves making gadgets do things they were never designed to do

# Mobile

# Studio To Go

**Ian McGurran looks at the next step in mobile Digital Audio Workstations**

**F**or better or for worse, the iOS platform has become the home of innovation in many different creative areas. Often this is related to a past history with Apple computers, with many creative fields favouring Cupertino's machines in the past, and many industry standard applications – at least to start with – being released on the Mac platform. One of those areas is audio, and its on the iOS platform that some of the most innovative audio software is now appearing. Software such as Auria Pro, from WaveMachine Labs, software that claims to be a fully fledged digital audio workstation, and it's a claim that's justified.

Digital Audio Workstations, or DAWs, aren't entirely new on iOS, with cracking efforts from industry stalwarts Korg (Gadget) and Steinberg (Cubasis). Plus, of course, Apple's Garageband, which has become far more capable than many give it credit for as it has matured. Auria Pro, however, offers something new – industry standard plugins, from

the likes of Fabfilter and PSP, built into the app – well, sort of, though some require an in-app purchase. What it means is that, for possibly the first time, the worlds of mobile and desktop audio have collided.

So what does Auria Pro offer? It has the standard combination of both MIDI and audio recording, with full editing that includes the ability to stretch the audio, to fix wonky timing or even change the tempo after recording. There are unlimited tracks plus other pro features such as bussing, to allow channels to be grouped together – such as an individually recorded drum kit.

It's here that Auria Pro moves ahead however, with the ability to process the recordings with the extra plugins. In pro-audio circles, the Fabfilter and PSP plugins are very highly regarded, and cost considerably more for the desktop versions than for Auria Pro. That's not to say these are cut down versions, as they are at least 90% the same as their counterparts, and that's a big step forward for the

platform being taken seriously. There are both traditional effects and full on programmable synthesizers, even a mastering plugin for that pro-sound finish.

Of course, there's still the issue of getting the sound into the iPad in the first place, and for this you'll need a class-compliant USB audio interface and the Apple USB Lightning adapter. Thankfully, there are more of these interfaces available at a reasonable price these days, including Tascam's 16x08, that, with 16 inputs is ideal for recording a small group. So, where in the 80s and 90s bands would have either bought a cassette tape four-track or stumped up the cash for a studio demo – neither of which would likely not reach the quality of what can be achieved here – now things are very different.

While Auria Pro has upped the ante for the DAW on the go, it's actually likely to be more of a stopgap to the age of iOS Audio Unit integration; one of the major innovations introduced in iOS 9 that snuck under the radar of most. Simply put, it brings the OS X plug in standard over to the iOS platform, meaning that the plug ins that have become an essential part of modern music making can now begin to appear on the mobile platform too. Of course, Audiobus has offered something similar in the past, but it has meant switching applications, whereas AU plugins stay within the app. Garageband is already (very) capable of this, and the difference in workflow is positive. With iPads only increasing in power, it may soon be the case that the platform is considered every bit the equal of the traditional desktop DAW.



# Capture The Desktop

**Andrew Unsworth loves video capture tech but, surprisingly, not when he's gaming**

It's surprising how many people record video of themselves gaming and upload it or stream it to the web. What's even more surprising is the number of people who watch other people gaming. As much as I love gaming, I've never felt the urge to record myself shooting a zombie in the face with a sawn-off and before uploading it to the web for the world to see. Not that I begrudge anyone else doing it. I don't watch golf either, but I certainly wouldn't stop anyone else watching it – except for my wife, obviously, and my children. And their children. And the dog.

To be honest, my lack of enthusiasm could be a generational thing. Millennials seem to be much more extrovert and more willing to publicise everything about their lives, even the mundane things like playing games. Being an introvert, I'd rather not publicise the fact I enjoy slapping rebel scum in *Star Wars: Battlefront* during my spare time. Especially when I have an entire list of jobs around the house to ignore.

Paradoxically, I love playing around with gaming-oriented video capture devices. I've reviewed a few of them, and I love the ease and convenience of the best models, which makes uploading and streaming video to the web a doddle. For me, though, the best use of these devices is to record video of the desktop.

As a tech journalist, it's handy to record video of desktop applications and BIOS screens; partly as a memory aid and

partly so that the video can be used as part of a review. As an example, I could say that a motherboard has a slow, jerky BIOS. If I have video of a different BIOS on a rival motherboard, I can compare the two to see if there's a difference in performance without having to rely on my fallible memory.

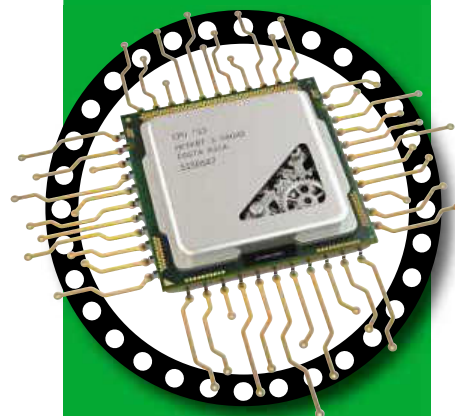
invaluable in the past when I've been smacking my head against my joypad due to my lack of progress in a game.

The catalyst for the above rant is my recent semi-impulsive purchase of an Avermedia Game Capture HD II. I haven't had a proper chance to use it, but hopefully it'll do what I want. The

**“ I love playing around with gaming-oriented video capture devices ”**

Another benefit of video capture tech is the ability to easily record video of software features that are better seen than explained with words. This is what gamers do when they want to demonstrate techniques, features and walkthroughs, and I'm all for that. These videos have proved

Game Capture HD II can record video to a USB flash drive, which is exactly what I want. Even better, you can embed a 2.5" drive within it and record directly onto that, making it a self-contained, all-in-one unit. Next week I'll see how the Avermedia unit performs, and how it compares to my favourite video capture devices.



Andrew Unsworth has been writing about technology for several years, he's handy with a spanner, and his handshaking skills are second to none

# Hardware



Ryan Lambie has loved videogames since he first stared up in awe at a *Galaxian* arcade cabinet in his local chip shop. 28 years on, Ryan writes about gaming for Micro Mart. He's still addicted to chips and still useless at *Galaxian*

## Under The Sea

*The cutest submarine in videogaming? Possibly. Insomniac's gone 2D for its forthcoming free-roaming shooter, Song Of The Deep*

**This week, Ryan takes a look at a new shooter from Insomniac Games, and checks out the new MMO set in the Warhammer 40,000 universe...**

### Plug & Play

California-based studio Insomniac Games is perhaps best known for relatively big-budget console franchises like *Resistance* and *Ratchet & Clank*. With *Song Of The Deep*, however, it's trying something rather different: not only does the game mark a rare foray into PC territory for the company, but it's also a more hand-crafted, indie-looking title than we've previously seen from it.

Inspired by Irish myth and legend, *Song Of The Deep* is about a young girl, Merryn, who builds her own submarine and searches for her missing father deep beneath the ocean waves. In terms of gameplay it's a free-scrolling shooter that recalls classic 80s games like *Cybernoid* and *Gravitar*; Insomniac's fantastical version of the ocean is a hostile landscape of deadly sea urchins and bullet-spitting disembodied heads. Merryn's submarine may be a fragile-looking thing, but it moves nimbly through the water and has a handy extra mechanic: objects floating in the water can be snagged by a cable and flung at enemies, or used like a wrecking ball to smash barriers.

*Song Of The Deep's* action may be retro, but its graphics are something else: in Insomniac's

hands, the ocean floor is a spooky landscape of diffuse light and submerged cities. Apparently inspired by the Oscar-nominated animated feature *Song Of The Sea* and the work of Japan's Studio Ghibli, the game has a gentle, lyrical quality; in fact, Insomniac even plans to release a children's book based on the title, which tells you a lot about the tone it's going for. We suspect, however, that *Song Of The Deep's* soft exterior belies a stern challenge – much like last year's unexpectedly tough *Ori And The Blind Forest*, which looked cuddly but quickly left us shouting at our monitors in decidedly family unfriendly fashion.

Insomniac has described *Song Of The Deep* as its passion project, and even in the little that we've seen of the game so far, it's clear that a huge amount of care and attention has been put into bringing its aquatic fantasy to life. It's a 2D game, sure, but the hand-painted graphics suggest a landscape that extends far into the distance. The sheer size of the undersea creatures – from luminous jellyfish to huge sea serpents – compared to the player's tiny craft providing the constant sense of being lost in a huge watery world.

*Song Of The Deep's* out in the spring. We're intrigued to find out what other hidden depths the game has to offer.

### Online

There are now so many titles based on Games Workshop's tabletop games that it's difficult to know where to start. Love first-person shooters and have an irrational hatred of rats? *Warhammer: End Times – Vermintide* has you covered. Have a passion for huge, cathedral-like ships doing battle in space? *Battlefleet Gothic: Armada* is the game for you. Love MOBAs? *Warhammer 40,000: Dark Nexus Arena's* a decent place to start.

Those are but three of the Games Workshop licensed games due out in 2016, and there are more on the way. Why? Because, back in 2011, Games Workshop changed the way it sold licenses to videogame companies, meaning that multiple companies can work on their own games within, say, the Warhammer 40,000 universe without having to buy the rights to the whole property. This is why we can have Whitebox Interactive making its *Dark Nexus* MOBA at the same time Tindalos makes its *Battlefleet* real-time strategy title.



▲ Space Marines clash with Orks, Eldar and more in Behavior Interactive's online shooter, *Warhammer 40,000: Eternal Crusade*

To this list of games we can also add *Warhammer 40,000: Eternal Crusade*, a third-person shooter MMO by the studio Behaviour Interactive. The shooter recently appeared on Steam Early Access, though be prepared to pay something approaching the price of a full-price game to give it a try – at the time of writing, the cost of accessing *Eternal Crusade* will cost you £32, with the price rising to £40 once the offer's up.

That steep barrier to entry aside, the game itself looks like an appropriately foreboding recreation of *Warhammer 40,000* lore. It sees detachments of Space Marines face off against such familiar foes as Orks, Eldar and Chaos Marines in 30 vs 30 PvP matches, with the winners

of those bouts gaining control of territory from their rivals. A second mode is a PvE fight to the death with five players facing off against hordes of vicious Tyranids. In either mode, the action looks fast, chaotic and bloody – Space Marines may be clad in armour like a tank, but even they won't survive a firm poke in the ribs with a giant chainsaw. Behavior have a long future planned for *Eternal Crusade*, too; on the game's website, the studio talks about its plans to evolve the game over the next 10 years, with a persistent open world akin to *Planetside 2*'s among the major additions scheduled for the near future.

Behavior also has an intriguing business model planned:

purchasing a copy of the game will provide subscription-free access to the game, though there'll also be an in-game shop for cosmetic items. There is a free-to-play option, too, which Behavior dub, "Feeee-to-Waaagh". The big catch? You can only play as an Ork...

*Warhammer 40,000: Eternal Crusade* is due to launch in the summer. You can find out more at [www.eternalcrusade.com](http://www.eternalcrusade.com).

## Incoming

Given the decidedly uneven track record of *Transformers* licensed games, *Transformers: Devastation* was far better than it had any right to be. The secret of its success, perhaps, was that it had Japanese developer Platinum Games behind it – the studio which previously bought us the bonkers brawlers *Bayonetta* and *Metal Gear Rising: Revengeance*. Now, Platinum's in the licensing

game again with *Mutants In Manhattan*, its take on the *Teenage Mutant Ninja Turtles*. Like that *Transformers* game from last year, *Mutants In Manhattan* is a heady mix of combo-heavy brawling and heady nostalgia – the cell-shaded graphics and chunky character designs are intended to provide the colourful air of a 90s comic book or cartoon show.

As you might expect, there'll be four-player co-op mode, which means you'll just have to fight over which turtle you want to play as. Games based on the Turtles property have had their ups and downs over the years (the Konami coin-op is still our favourite), but if *Devastation* taught us anything, it's that we should never bet against Platinum. *Teenage Mutant Ninja Turtles: Mutants In Manhattan* is scheduled for release this summer.



▲ Cowabunga: *Metal Gear Rising* and *Transformers Devastation* studio Platinum is making a new brawler based on the *Teenage Mutant Ninja Turtles*

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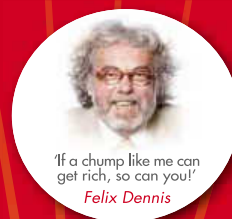
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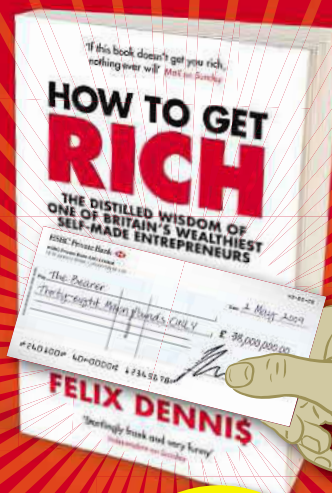
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Email: davethomas96@aol.com

**Gigabyte Z68X-UD3P-B3 motherboard** with Core i5 2300 AND 8GB 1333Mhz RAM. All you need is a HDD, case and PSU. Very reliable. Runs XP up to 10. Drivers included. All for £175!!  
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Email: ianmatthewuk@yahoo.co.uk

**56kb Fax Modem External.** £10.  
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**Toshiba Satellite Pro A210 Laptop.** AMD Dual Core 1.90GHz CPU. 3GB RAM. 120GB SSD Drive. Wifi. Windows 7 Ultimate. Office 2007. BitDefender 2015 AV. £95 ovno.  
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Email: bob@docbobs.com

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## HARDWARE WANTED

**Trying to breathe life back into an old machine? Why not submit a wanted ad to MicroMartClassifiedAdverts@gmail.com and see if any of the thousands of computer enthusiasts who read the magazine each week have what you're looking for?**

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**WANTED:** You bought a Corsair water cooler, with a square block. You fitted it to your Intel processor. You want to make a few pounds from the spare A.M.D. bits? Contact me!  
Email: johnrpeel@gmail.com

**WANTED:** Gigabyte GA-Z77X-D3H motherboard wanted.  
Email: johnbeiry@gmail.com

**WANTED:** PC Tower case (beige colour if possible) to rehome an Amiga A1200 vintage computer. The Amiga motherboard is H 410mm x L 190mm (H 16" x L 7.5"). PSU not an issue but if available 250 watt more than enough.  
Tel: Bill (07742) 061569 or (02641) 769503.

**WANTED:** 3G dongle for Archos 80 G9 tablet.  
Email: alancox28231@gmail.com

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Email: a2345@btinternet.com

**PCB design software.** 127 layers, schematic entry, PCB entry, PCB to Gerber file converter, output to printer. £9.99  
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Email: cresswellavenue@talktalk.net  
**Microsoft Office 2013.** Original Software only £100.  
Tel: Gordon (01314) 660205  
E-mail: scobie09@gmail.com

**Cyberlink PowerDVD 12 Standard.** Runs under Windows 8, 7, Vista or XP. Original CD with unused product key £7.50  
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Email: a2345@btinternet.com

**Nuance Omnipage 18.** OCR; Windows 8, 7, Vista or XP, Original CD with unused product key £25.  
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Email: a2345@btinternet.com

**Acronis True Image Home 2012.** Bootable CD. Application runs under Windows 8, 7, Vista or XP. Original Acronis CD with unused product key £5.  
Tel: Ian (01932) 856971  
Email: a2345@btinternet.com

**Norton Family Premier 2.0.** Runs under Windows 8, 7, Vista or XP, Original Symantec unused product key £15.  
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Email: a2345@btinternet.com

## SOFTWARE WANTED

**Good Text to Speech program** WinXP or 7 to read ebooks aloud for a pensioner with few resources.  
Tel: Wilf James (01767) 699809

**Wanted: PictureToExe** software, for making picture shows.  
Tel: (01202) 610602  
Email: ivor.mary@talktalk.net

**Wanted: Quicken 2001.** I desperately require a copy of QUICKEN 2001, UK Edition. I need to reinstall the program but have lost my original installation CD.  
Email: david.maddams@icloud.com

## IMPORTANT BUYING ADVICE

**We work very hard to police our classified ads, and make them as secure as possible.**

**However, please do your bit too and use the following guidelines:**

- **Never - NEVER** - pay by bank transfer or post out cash, unless you know the trader already, or are sure it is okay to do so. Pay by cheque, Paypal, Nochex etc wherever possible.
- Be wary of anyone who insists on you paying by the above methods if in doubt, get us to check them out by mailing editorial@micromart.co.uk
- Keep copies of all correspondence
- When sending out goods, at the least obtain a certificate of posting from the Post Office

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# ASK AARON



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Send your questions to:  
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Micro Mart  
Dennis Publishing  
30 Cleveland Street  
London  
W1T 4JD

Contact Aaron by email at:  
aaron@micromart.co.uk

Please try to keep your queries brief and limit them to just one question per letter, simply so we can squeeze in as many as we can each week. Please include relevant technical information too.

*Aaron*

## Bootmgr MIA

During my usual yearly format and reinstall of my PC, during which I reinstall Windows 7 and all my apps in order to try and keep my PC running quickly, I ran into a big problem: for some reason, my PC locked up during my factory reset procedure (my PC has a built-in reset option).

Now, when I try to boot the machine, even to re-attempt the reset, all I get is an error that tells me bootmgr is missing. The system won't boot up, and I can't get into Windows.

As my system has an install partition, I've not used my Windows 7 disc (which I also got with the system upon my insistence that I have a physical backup).

I'm worried, as I can't even boot back into my system any more, and it's left as so much dead weight. Can you suggest how I may fix this?

**Kev**

*In order to fix this problem easily, you'll need to break out your Windows 7 install disc. There are two ways we can go about this, and both involve using the disc's recovery tools. So, to begin, insert the disc and boot up your PC. After your system has passed the POST boot up screen, select the option to boot up from the disc. If you don't have this option, you'll need to go into your system's BIOS and ensure the option to boot from disc is enabled.*

*Once you boot up the disc, press Next, but don't follow the option to install Windows. Instead, select the option to repair your*

*computer. The installer will attempt to detect any previously installed operating systems, even broken ones. Click next when it's done and you'll be able to use a couple of options to get your system back in working order.*

*First, the easier option, which is the startup repair selection. This is an automatic option that'll attempt to repair your currently installed copy of Windows for you. It can take a few minutes, so let it run, and once it's done, try to boot up your machine. If all has gone well, Windows should load as normal. If not, move on to the next method.*

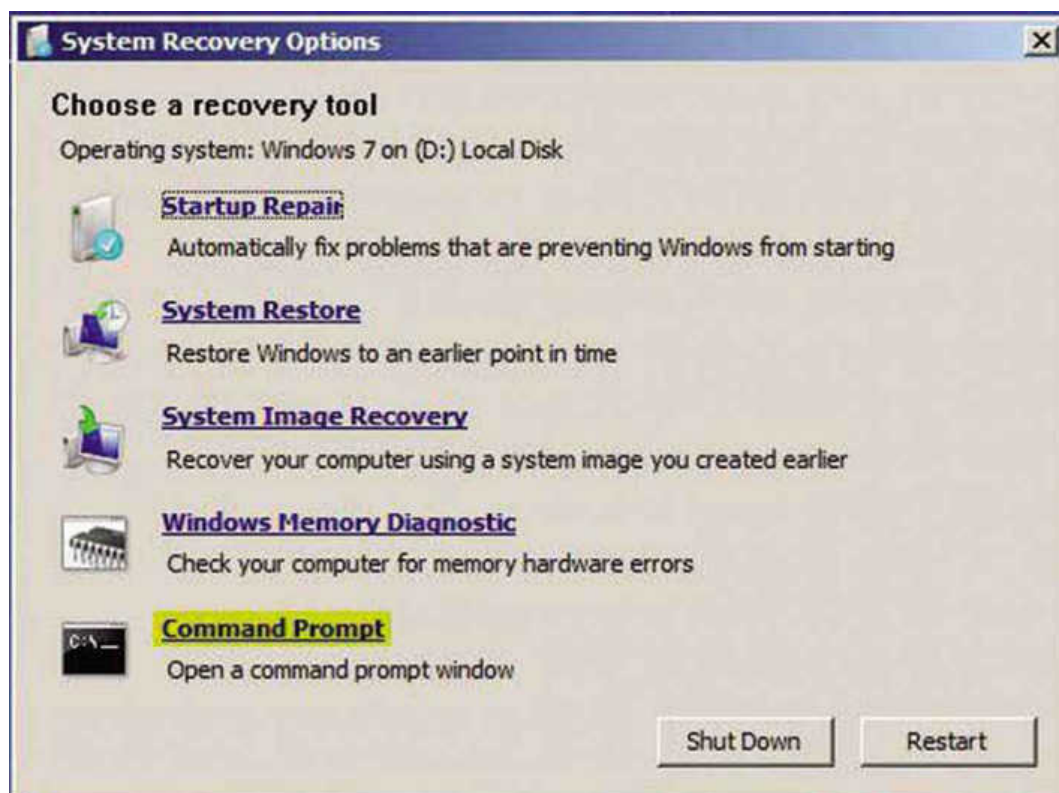
*For this fix, we'll use the command prompt to fix your Windows installation. From the same screen you selected the startup repair from, pick the command prompt options instead. This will take you to an active command prompt where you can use a range of tools to fix issues with Windows.*

*At the prompt, type 'Bootrec /RebuildBcd' and press Return. This will run a process that'll rebuild Windows' bootup file system, including the bootmgr file. This should solve your problem, so once done, reboot and load Windows as normal.*



```
BOOTMGR is missing
Press Ctrl+Alt+Del to restart
```

▲ If you see this error, you'll need to fix Windows' boot process using an install disc



▲ The Windows disc recovery tools can fix bootmgr problems

## Email Association

I use Microsoft Office 2013, and one of the main reasons I do so is Outlook. I find using my own email client far more agreeable than one of the usual webmail options like Gmail or Yahoo, and I find it gives me much more control over my mail, how I store it, and how I work with it. It's great.

Lately, though, I've been getting an odd error that's greatly affected my use of Outlook. Actually, that's quite an understatement, as I'm having to use Gmail to send you this mail!

Basically, when I now go to check mail in Outlook, I get an error message, and it can't check for mail. The error message is:

*"There is no email program associated to perform the requested action. Please install an email program or, if one is already installed, create an association in the Default Programs control panel."*

I don't understand the meaning of this, as I obviously have Outlook installed, otherwise I wouldn't even be getting the error message. It only pops up when I try to check for mail.

I really don't understand how this error has come about, and how it can complain when I'm clearly using an email program. Can you help?

**Simon**

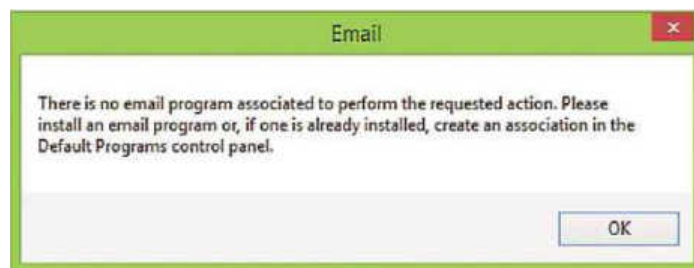
*This is certainly an odd situation to be in, as you clearly do have Outlook installed, and so shouldn't have any problems sending and receiving mail with it. However, the key word here is 'associated'. Although you have an email program, for some reason your computer has lost the information regarding which app you want to use for checking mail. As this is the case, Windows doesn't know what to do when the request is triggered. It can be fixed easily enough, though.*

*The answer lies with the Registry Editor, so you'll need to fire it up by pressing Windows+R and typing 'regedit' followed by return. Before you continue with this fix, I always recommend you backup your Registry first, so be sure to highlight the root of the Registry (Computer, in the left-hand panel), and click File > Export. Save the exported Registry to a safe location, and this can be used to restore it should anything go wrong. When you're done, continue on below.*

*To begin, you'll need to navigate to HKEY\_LOCAL\_MACHINE\SOFTWARE\Clients\Mail. Highlight the Mail entry and in the right-hand pane you should see the REG-DWORD value 'PreFirstRun'. Highlight this and delete it. Now, under the Mail entry in the left-hand window you should see an entry for Microsoft Outlook. Highlight this and delete it. Once this is done, close the Registry Editor and reboot your PC. Once you're back in Windows, try using Outlook again. You should have no problems, and will once again be able to use your favourite email client.*

*Although you shouldn't need to you may also need to run the Office Diagnostics. To do this, once you've closed the Registry Editor, open Outlook and go to Help > Office Diagnostics. Follow the onscreen instructions and once done, reboot.*

▼ *If you get association errors with Outlook, your answer lies in the Registry*



## Deadly Games?

Please understand, I'm new to computers, and am about as technically proficient as a newborn babe. I purchased a cheap computer to play some strategy games after a friend in our social club persuaded me to give it a go. I did and found that I enjoyed playing them. Who knew?!?

However, after a while, my PC began to slow down and eventually I got constant black screens, leaving me only the option to shut it off at the power and restart. I noticed the computer seemed to be very warm (air coming out of the back), but it seemed to be fine all the same.

I simply want to know, is this normal behaviour, or can some games damage my computer? Sorry for such a dumb question.

**Jack**

*That's not a dumb question at all, Jack. Games can, albeit rarely, hurt your PC, and in your case, it would appear as though this*

*potential damage is due to overheating. Basically, some games have better graphics, and more complex code than others. This means the computer has to work harder to run it, and this often requires more power, which in turn results in more heat being generated. If your PC doesn't have adequate cooling, this heat can build up and can cause overheating of your components.*

*Often, PCs and hardware have built-in safeguards to prevent damage, such as shutting down programs, or even the PC, which is why a lot of system apparently crash, or hang. It's usually just the system trying to prevent damage.*

*You should probably ask a friend who knows more about PCs, or your local computer shop to check your PC and see if it has sufficient cooling, with the preference being a friend, as shops will usually charge for the diagnosis.*

*You could also simply run the PC with the side of the case removed, which would give you much more airflow, and so may cool*

*things down. This alone may help you figure out if you have an overheating problem.*

▼ *This is a rather extreme answer to CPU cooling, but even lower-end systems need some form of solution*



# ASK JASON



**Meet Jason D'Allison, a veteran of Micro Mart's panel of experts. He's here to help with any technical questions, including anything to do with tablets or smartphones, as well as PCs**

Send your questions to:  
Jason D'Allison  
Micro Mart  
Dennis Publishing  
30 Cleveland Street  
London  
W1T 4JD

Contact Jason by email at:  
jason@micromart.co.uk

While we try to cover as many questions as we can, we regret that Jason cannot answer your questions personally, but he'll cover as many as he possibly can each week. Please ask one question per letter and remember to include the full specification of your computer, including its operating system.

*Jason*

## All Fired Up

I've just bought an Amazon Fire TV Stick. It works well enough, but I've already run up against the limitations. I understand it's possible to put Kodi on it, which would give access to unofficial streaming services and also let me play my own files. I'm having trouble with the setup process, though.

Some of the guides mention strange PC software and the need to enter gobbledygook on a command line, but one guide I've found suggests that Kodi can be installed using just the Fire TV Stick and its remote. The first step is to install ES File Explorer from the Fire TV app store, but I can't find this. Even a manual search draws a blank. What am I doing wrong?

**Danny, Gmail**

*You're not doing anything wrong, Danny. Most Kodi guides for the Fire TV and Fire TV Stick are out-of-date. Fairly recently, you see, the good folks at Amazon pulled ES File Explorer from the Fire TV shelves. That's why you can't find it. They did this solely because it can be used to install the likes of Kodi. The crafty devils.*

*Not crafty enough, though. It's still pretty easy to install it, and you won't have to cast even a sideways glance at a command line. You don't need a PC, either. You do need an Android phone or tablet, however. If you don't own one, borrow one. Ten minutes should be enough.*

*First, on your Fire TV Stick, go to Settings > System > About. Write down the IP address. Next, go to Settings > System > Developer Options. Enable both 'ADB debugging' and 'Apps from Unknown Sources'. Finally, go to Settings > Applications. Disable 'Collect App Usage Data'.*

*Now turn to your Android device. Download and install ES File Explorer from Google Play and also download and install Apps2Fire. Don't launch ES File Explorer but do launch Apps2Fire. In Setup, enter your Fire TV Stick's IP address, then*

*click Save. Next, under Local Apps, select ES File Explorer. You should now see Apps2Fire 'push' ES File Explorer to your Fire TV Stick. Once this is done, click OK.*

*The remainder of the tutorial you've found should now work as planned. Basically, on the Fire TV Stick, go to Settings > Applications > Manage Installed Applications. Find ES File Explorer, launch it, and use it to visit [goo.gl/ew9hFx](http://goo.gl/ew9hFx). From there, download and install the ARM version of Kodi. That's about it, but one snag you'll soon encounter is that apps not acquired via the app store aren't given an icon on any of the Fire TV Stick's home screens. Every time you want to launch Kodi, you'll have to go to Settings > Applications > Manage Installed Applications. Hardly ideal.*

*Luckily, Danny, there's a workaround. Run ES File Explorer again and visit [goo.gl/cKULS0](http://goo.gl/cKULS0). Download and install the latest .apk file for FireStarter. With FireStarter running, go to Settings, configure Home Button Single Click Application to 'No Action', and configure Home Button Double Click Application to 'Kodi'. From then on, you'll be able to launch Kodi simply by double-tapping the home button on the Fire TV Stick's remote. Neat, eh? The good folks at Amazon may be crafty, but there will always be enthusiasts who are craftier.*

*Note – Because you've already got a tutorial, I've deliberately sped through the proceedings that follow the installation of ES File Explorer. However, if you get stuck, and for the benefit of readers who are starting from scratch, visit [goo.gl/qfT6z7](http://goo.gl/qfT6z7) for a video explaining how to use Apps2Fire, [goo.gl/J3zN7S](http://goo.gl/J3zN7S) for details on installing Kodi, and [goo.gl/dpSmle](http://goo.gl/dpSmle) for help with FireStarter.*

▼ **Kodi (the new name for XBMC) is becoming so popular that even non-geeks are asking for it (though it's often still geeks who have to set it up!)**



## Paper Chase

Any idea how I can print from OpenOffice now that I've upgraded to Windows 10? I'm using a Canon Pixma MP220, which has never let me down before. The only options I get are Foxit Reader PDF Printer and Microsoft XPS Document Writer, which both produce files, not prints. Once, I saw a dialogue box instructing me to enable bi-directional support (what on earth is that?), but it's not popped up since. I'm beginning to wish I'd stuck with Windows 7.

**Sarah, Outlook.com**

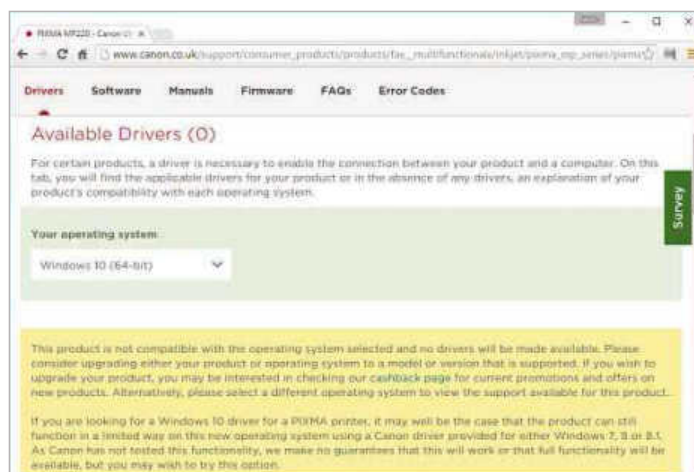
*If your only options are to output as PDF and XPS, the printer isn't installed. Windows doesn't have the required driver. It's tried its best – hence the bi-directional business – but ultimately it's thrown in the towel and needs a driver direct from Canon. And that's not going to happen, I'm afraid. See here: [goo.gl/dQqsTQ](http://goo.gl/dQqsTQ).*

*Yes, Canon doesn't support the MP220 under Windows 10. That's a poor show, I say, given that it does support it under Windows 8.x, which was really just Windows 10's beta. Still, I believe the MP220 was launched in early 2008, and it's probably a bit much to expect a company to roll out new drivers for the best part of a decade. However you shake it, though, it's still forced obsolescence, which is a vital function these days, it would seem, in a successful business.*

*As Canon says on the page linked to above, you may have luck using a Windows 8.x driver. It's certainly worth a go, Sarah – you*

*won't break anything. If that doesn't help, you've two choices: buy a new printer (a crying shame if you've personally only owned the MP220 for a couple of years) or roll back to Windows 7. To do the latter – assuming you've upgraded to Windows 10 within the last month – just click Start > Settings > 'Update & security' > Recovery. You should see an option called 'Go back to Windows 7', and from there, simply follow your nose.*

▼ **Not what you want to see when trying to get your peripherals to work**



## New Boots

I've got a Toshiba Satellite C50D laptop. It's two or so years old and needs wiping clean – there's all sorts of junk on it, courtesy of my wife. It's running Windows 7 and there's a product key on the base, but naturally no setup DVD was supplied. I've borrowed one from a colleague, but – like a total idiot – it's only now I've remembered the laptop has no DVD drive. Is there a way to install Windows 7 from a USB stick?

**R. Brooks, California (yes, really!)**

*Yes, it's perfectly possible to install Windows 7 from a USB stick. First, you need to create an ISO file from your setup disc, and doing that requires a system with a DVD drive (I'm sure you know somebody with one). On that system, download BurnAware (the free version): [goo.gl/URSCj](http://goo.gl/URSCj). \* Pop the disc into the drive and follow BurnAware's instructions. Of course, readers who already have the required ISO file – perhaps grabbed from the much-missed Digital River repository – can skip this step.*

*Now, as with a bootable DVD, a bootable USB stick needs to be correctly set up, and the contents of your ISO file need to be suitably extracted. Raise a glass, then, to Microsoft's handy little Windows 7 USB/DVD Download Tool: [goo.gl/qV04Bw](http://goo.gl/qV04Bw). This can be used for any Windows version from XP onwards. You'll need a stick with at least a 4GB capacity, and it'll be completely wiped. This part of the process can be done on your laptop if that's easier, but obviously you'll first have to transfer the ISO file from the system you created it on.*

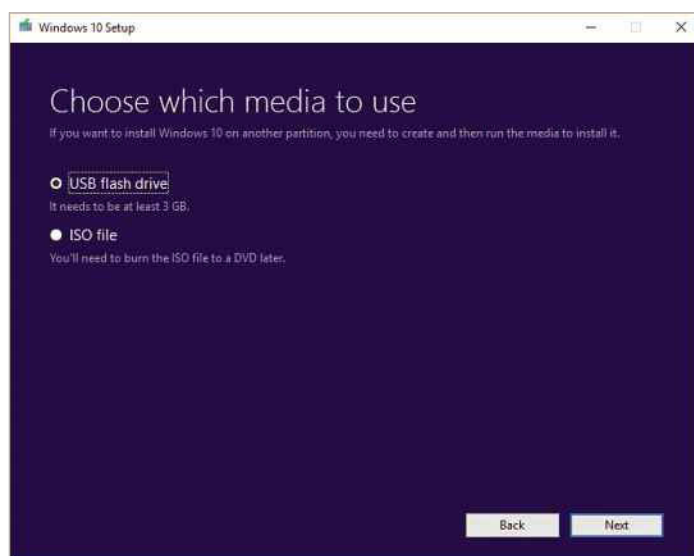
*Lastly, make sure your laptop's BIOS/UEFI has the USB stick set as the first boot device (this option might not appear unless the stick's actually inserted). Alternatively, there'll probably be some function key you can press at start-up to bring up a boot menu.*

*Have you considered moving to Windows 10, though? If that's your plan, there's now no requirement to do it (at least the first time) from a working and activated installation of Windows 7 or 8.x. Since*

*November, it's been possible to clean-install Windows 10 using a Windows 7 or 8.x product key. To get started, download and run the Media Creation Tool: [goo.gl/RQaUBn](http://goo.gl/RQaUBn). This works similarly to the tool mentioned earlier, but this one not only creates a bootable USB stick but also downloads the desired ISO file. It doesn't get much easier than that.*

*\* Be sure to select 'Custom installation' when setting up BurnAware. If you don't, you'll end up with some wretched toolbar in your browser.*

▼ **It's now possible to clean-install Windows 10 using a Windows 7 or 8.x product key**



# Crowdfunding Corner

Tracking devices are increasingly useful security tools for modern life, and this week, we found a pair of them on Kickstarter that we think you might just be interested in

## Serenity: The World's First Intelligent Bag Guardian

From smartphones to ereaders to laptops, it's more and more common to carry incredibly expensive hardware around in your bag or rucksack, and that makes theft of them an even more attractive prospect. Serenity isn't the first digital tracking device to be created, but it is the first to be aimed specifically at preventing the theft of your bag.

Rather than help you track a bag after it's been taken, the Serenity device allows your bag to recognise when it's being tampered with and notify you if you move too far away from it. The tracker is automated so it activates as soon as you move a specified distance away, and it deactivates if you get close enough, so you can open and move your bag without setting off any alarms, but no one else can.

If you get in early, you can pick up a Serenity Guardian for \$79 (£54), but the full price for non-early Kickstarter backers is \$99 (£67), so it's not a huge loss if you wait. Devices are available in gold, silver or black and include the free mobile app you need to use it. If you're really keen, you can pay extra to get a specially engraved version. The project's target of \$40,000 hasn't been met yet, but they've raised \$6,000 after only two days, so it seems well within reach.

**URL:** [kck.st/209fHBf](http://kck.st/209fHBf)

**Funding Ends:** Thursday, 3rd March 2016



### Technical Specifications

- Sleek Gold, Silver or Black Finish
- Long Battery Life
- Rechargeable
- 100+ DB Alarm
- Water Resistant

## Keyper Rechargeable Bluetooth Tracker Device

Along similar lines, the Keyper is a rechargeable tracking device designed to help you find your keys no matter where they are. The tiny, keyring-sized device can be attached to all manner of objects (not just keys!) to track their location.

Features include GPS map positioning, two-way tracker alarms so you can play sounds on your Keyper or your phone (or both) if they lose contact with one another, a USB-chargeable battery that lasts six months, and the extra ability to control your phonecalls and camera from the Keyper itself by using it as a Bluetooth remote. The bundled app is, of course, iOS and Android compatible, and the device is available in a veritable rainbow of colours – 11 in total.

The cheapest way to get a device is on the Early Bird tier, which still has more than 900 units left. For \$22 (£15), you get your choice of colour and a magnetic micro-USB charge strap and (of course) the control app. Miss that tier and it's only \$2 (£1) more for the full-price version. By the time you read this, it should also have hit its target, so why not go check it out if you think it sounds useful? Shipping is due for March 2016.

**URL:** [kck.st/1NQ7SJF](http://kck.st/1NQ7SJF)

**Funding Ends:** Thursday, 3rd March 2016



*Disclaimer: Images shown may be prototypes and Micro Mart does not formally endorse or guarantee any of the projects listed. Back them at your own risk!*

# App Of The Week

# Tap Tycoon

## David Hayward is once again addicted to a crazy Android game

**A**ndroid games have improved greatly in recent times, with graphics and gameplay not too far from what you can get on PCs or consoles. However, for me at least, it's the odd little time wasting games that really boost the Android gaming scene.

Games like *Plague Inc.*, *Profiteer* and a host of other such wonderful examples are what make having a tablet fun – alongside more serious apps, of course. Hence this week's app of the Week, *Tap Tycoon*.

*Tap Tycoon* is an idle game, where your main task is to simply accumulate as much profit as possible by tapping the screen to make it rain cash and to build up an empire of businesses to help bring in money by the second.

### Tapping Mad

It's a very simple concept, one that doesn't set it too far apart from countless other

idle and tapping games out there. But there is an extra element involved here that gives *Tap Tycoon* a slight edge over the competition.

As you progress through *Tap Tycoon* you'll eventually come to a point where you're unable to continue or buy more upgrades for your businesses. You could leave the tablet alone, putting the game in idle mode to build up your wealth over time, but a faster way is to hit the Prestige button and restart your game with a significant percentage business boost.

Along with the percentage boost, you'll also be able to claim Tech Cards, which offer a bonus for various upgrades, and you'll get to donate a number of troops to your country to help fight in the weekly *Tap Tycoon* war.

The war element doesn't require much input from you; all you do is provide the

### Features At A Glance

- Odd, addictive gameplay.
- Contribute to a country versus country war every Sunday.
- Gain huge bonuses and earn an incredible amount of game cash.
- Free, simple fun.

troops by ranking up to claim a few more to send. But if your country does well, you'll get an added bonus relative to the number of troops you donated to the war.

The bonus could be extra Tech Cards, more cash bonuses for your businesses or more diamonds.

The diamonds represent the payment model in the *Tap Tycoon* universe. For a certain amount of diamonds you can claim extra cash-boosting bonuses, receive a boost of several times your business net worth and other such benefits that will push well above the free player's abilities.

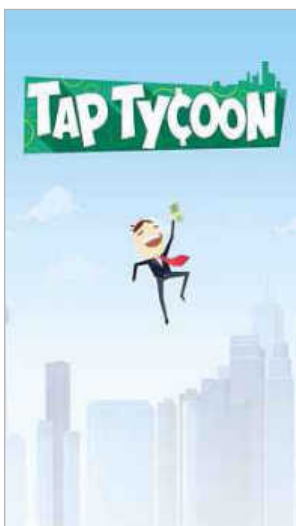
You can earn the odd diamond here and there, but they're usually in fives or tens, so it takes some time before you're able to get some use out of them.

Thankfully, though, you don't really need the diamonds, and a bit of clever gameplay will get you fairly highly ranked within a few days, so you can start earning some seriously large cash amounts.

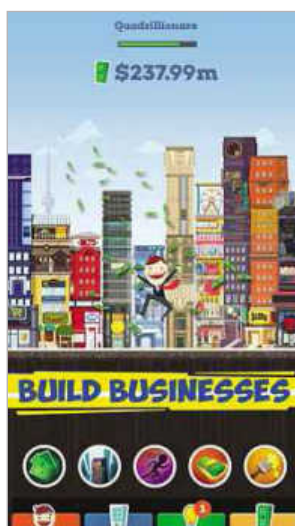
### Tap Addict

Am I addicted to this rather odd, simplistic Android game? Yep, I'll admit it. I am addicted to it.

Okay, so it's pretty easy and it's not everyone's cup of tea, but for some strange reason *Tap Tycoon* has me hooked for the time being. And if anything, it allows me to pass the time between flying from planet to planet in *Elite: Dangerous*.



▲ Tap to collect cash. If only real life was as simple



▲ Grow your empire and earn huge amounts



▲ Send troops to boost your country bonus in the weekly war

# Logging Off

It's an interesting world where a company can make \$18 billion in profit in a single quarter and it be described – at least in some quarters – as 'disappointing'. Yet that's exactly what happened to Apple when it released its latest financial results. Then again, investors tend to be interested in what comes next, not what happened historically, and their worry is that iPhone sales have flattened to show only a 1% growth year-on-year, and sales of the iPad are actually falling. Apple actually sold 25% less than a year ago, despite having launched its new Pro model in that period.

The problem isn't that people won't pay Apple's massively inflated prices, it's that the company has effectively become something of a one trick pony. That trick has been the iPhone, which now seems to have reached some sort of technical plateau making the future appear much less rosy.

The Watch is little more than an accessory to the iPhone so, until its redesigned to work with other platforms or in isolation, that's never going to become a flagship product. Apple TV isn't really worrying the likes of Roku or Amazon, especially outside the USA. So that effectively leaves the Apple Mac, a platform that seems to be still around because of some nostalgic connection to the company's founders rather than any great fiscal strategy.

Those that own Mac's are fearful that Apple will denude the functionality of their OS by moving it towards iOS, as they keep hinting at. If anything could permanently do for that product line, making them giant overpowered iPads would probably be it.

This all begs the question: where next for Apple and its cash cow? It's really hard to say, because it has become obvious to anyone that has bought a smartphone in the past couple of years that the companies making them are running out of ideas about what else to shove in them! When you've got all the sensors and a decent camera, then everything else we've seen chucked in there just seems superfluous, and probably undermines the already poor battery life we're getting.

I can say with some certainty that Apple won't compete on price, because then it'd be in the same boat as many Android phone makers, who struggle to make any profit at all. What it really need is an entirely new product that, like the iPod and the iPhone when they first arrived, effectively creates a new market that didn't previously exist.

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Many companies go through their entire existence only having one of these revolutionary products; Apple has had three, if you count the Macintosh. To expect it can come up with yet another in time to watch the iPhone go into the same decline that eventually overtook the iPod, seems a massively optimistic ask.

Then again, with a cash pile of more than \$200bn, it's got some small change to throw at product research and development to make magic happen. Having that much money in the back pocket also gives Apple time, and the ability to ride out some failure along the way.

The future of Apple isn't really about another must-have device, it's about its vision. Or, specifically that of its CEO, Tim Cook. These latest figures just indicate that we're rapidly approaching the point where Tim is revealed either as another visionary or just a caretaker for Steve Jobs legacy.

Mark Pickavance

## LAST WEEK'S CROSSWORD

**Across:** 7 Boundary Value, 8 Attach, 9 Twinge, 10 Abysmal, 12 Infra, 14 Badge, 16 Cashtag, 19 Skiver, 20 Pumice, 22 Social Plugins.

**Down:** 1 Post, 2 In-Laws, 3 Hashtag, 4 Kyoto, 5 Radian, 6 Bulgaria, 11 Black Box, 13 Walpole, 15 Give In, 17 Homage, 18 Troll, 21 Cone.

### DISCLAIMER

The views expressed by contributors are not necessarily those of the publishers. Every care is taken to ensure that the contents of the magazine are accurate but the publishers cannot accept responsibility for errors. While reasonable care is taken when accepting advertisements, the publishers cannot accept any responsibility for any resulting unsatisfactory transactions. It feels weird hitting milestones like 1,400 issues, or our 30th anniversary, because, while they may feel important to us, it leaves us wondering what they really signify in a world, especially the world of technology, that is constantly moving forward. It remains upon us to keep moving forward too, and come

up with more things that you want to read, more things for you to laugh at, and mix all that in with a healthy dose of nostalgia for the times when we got interested in computing – and, we suspect, many of you did too. We don't want to make you sound like a mean lot, but we suspect that 1,400 issues means very little to you, and quite rightly so... It's a decent bet you began buying *Micro Mart* to better understand the technology of whatever era you started buying it, and you continue because you want to keep abreast. We stay interested for exactly the same reasons. So, we'll raise a small glass to another 100 magazines under our belts and do our best to make sure we get another 100. So we'll see you for issue 1,500, eh? Here's hopin'!

## THIS WEEK'S CROSSWORD

### Across

7 Pretending to be someone you're not with intent to deceive; this practice is prohibited under the Twitter Rules. (13)

8 Great coolness and composure under strain. (6)

9 One of the four suits of playing cards. (6)

10 The Australian site of a vast military testing ground used in the 1950s for nuclear tests and since the 1960s for tracking space satellites. (7)

12 Unfriend someone and limit the ways they can get in touch with you on Facebook. (5)

14 Stop flying normally and begin to descend because the the angle of attack of the wings is too great to maintain adequate lift. (5)

16 Transfer programmes and data from one platform to another. (7)

19 Push, elbow, or bump against people roughly in order to make progress; typically in a crowd. (6)

20 Not disposed of by purchase. (6)

22 Someone who studies flags. (13)

### Down

1 One of the two most prevalent Internet standard protocols for e-mail retrieval. (4)

2 A unit of resistance equal to one million ohms. (6)

3 Isograms connecting points having equal barometric pressure at a given time. (7)

4 An enzyme which catalyses the hydrolysis of DNA into oligonucleotides and smaller molecules. (5)

5 The state capital of Minnesota. (2,4)

6 A sudden interruption in the supply of electricity. (5,3)

11 Old-fashioned. (8)

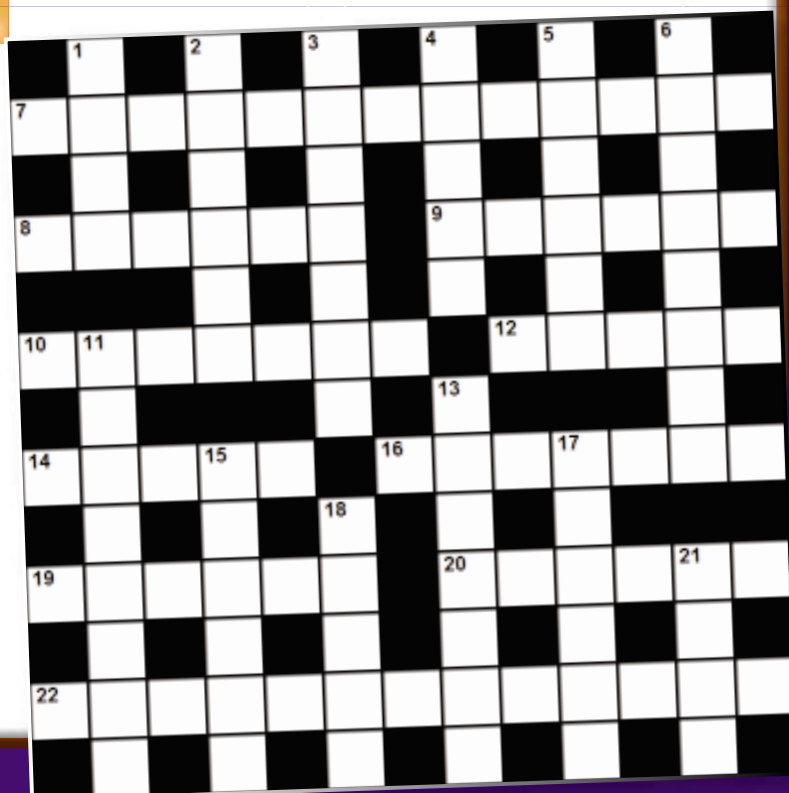
13 Customary observances or practices. (7)

15 .lv TLD (6)

17 Leave a job or position voluntarily. (6)

18 A response to another user's Tweet that begins with the @ username of that person. (5)

21 A high level, list processing language commonly used in artificial intelligence and computer research. (Acronym) (4)



# In Next Week's Micro Mart\*

- 15 essential extensions for your web browser
- How to make 3D objects in SketchUp
- The best tools for online collaboration
- Raspberry Pi HATs - powerful add-ons with no fuss
- Plus the usual mix of news, features, reviews and advice



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